

UNIDAD 1

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 3

Veamos:

$$\frac{8}{5} = \frac{3}{11} = \frac{1}{2} = \frac{1}{3} = \frac{8}{15} = 0,5\overline{3}$$

∴ La fracción que origina un decimal ilimitado periódico mixto es $\frac{8}{15}$

Rpta. E

Resolución 5

Al afirmar que "entre dos números reales siempre existe otro número real", queremos decir que el conjunto de los números reales es denso

Rpta. B

Resolución 6

Tenemos

$$\left\{ -\frac{3}{5}; 0,7; \pi; \sqrt{7}; \sqrt{16}; \sqrt[3]{-8} \right\}$$

↑ ↑
son números irracionales

∴ Hay dos números irracionales

Rpta. B

Resolución 7

Veamos

$$5,2666... = 5 + 0,2\overline{6} = 5 + \frac{26-2}{90} = 5\frac{4}{15} = \frac{79}{15}$$

Rpta. A

Resolución 8

$$A = \{<-\infty; 3>$$

$$B = [-2; 8>$$

$$\Rightarrow B - A = [3; 8>$$

Rpta. CA

Resolución 9

$$\begin{array}{l} \text{Veamos} \quad |4x - 7| = 13 \\ / \quad 4x - 7 = 13 \quad \vee \quad 4x - 7 = -13 \\ \quad 4x = 20 \quad \quad \quad 4x = -6 \\ \quad x = 5 \quad \quad \quad x = -\frac{3}{2} \end{array}$$

Como nos piden el valor negativo, $x = -\frac{3}{2}$

Rpta. D

Resolución 10

De las afirmaciones, $|6| + |-6| = 0$ es falsa pues

$$|6| + |-6| = 6 + 6 = 12$$

Rpta. D

Resolución 11

$$\frac{1}{14\sqrt{2}} \div \frac{1}{7\sqrt{2}} = \frac{1}{14\sqrt{2}} \times \frac{7\sqrt{2}}{1} = \frac{1}{2} = 0,50$$

Rpta. B

Resolución 12

- I. $a^5 \cdot a^2 = a^{10}...$ es falsa pues $a^5 \cdot a^2 = a^7$
- II. $\sqrt[3]{a^{27}} = a^3...$ es falsa pues $\sqrt[3]{a^{27}} = a^9$
- III. $b^7 \cdot b^7 \cdot b^7 = b^{21}...$ es verdadera.
- IV. $\sqrt{0,9} = 0,3...$ es falsa pues $0,3^2 = 0,09$

FFVF

Rpta. D

Resolución 13

Tenemos

$$\sqrt[3]{\sqrt[3]{-125} + \sqrt[5]{-243}} = \sqrt[3]{-5 + (-3)} = \sqrt[3]{-8} = -2$$

Rpta. B

Resolución 14

$$\begin{array}{l} 3\sqrt{12} - 3\sqrt{80} + 4\sqrt{45} - 2\sqrt{27} \\ 3\sqrt{2^2 \times 3} - 3\sqrt{4^2 \times 5} + 4\sqrt{3^2 \times 5} - 2\sqrt{3^2 \times 3} \\ 6\sqrt{3} - 12\sqrt{5} + 12\sqrt{5} - 6\sqrt{3} \\ 0 \end{array}$$

Rpta. E

Resolución 15

$$\begin{array}{l} L = \frac{\sqrt{50} + \sqrt{2}}{\sqrt{18} - \sqrt{2}} = \frac{\sqrt{5^2 \times 2} + \sqrt{2}}{\sqrt{3^2 \times 2} - \sqrt{2}} \\ L = \frac{5\sqrt{2} + \sqrt{2}}{3\sqrt{2} - \sqrt{2}} = \frac{6\sqrt{2}}{2\sqrt{2}} \\ L = 3 \end{array}$$

Rpta. C

Resolución 16

$$\begin{aligned}\frac{7\sqrt{2}}{2\sqrt{14}} \times \frac{\sqrt{14}}{\sqrt{14}} &= \frac{7^1 \times \sqrt{2} \times \sqrt{14}}{2 \times 14} \\ &= \frac{\sqrt{2} \times \sqrt{14}}{2 \times 2} = \frac{\sqrt{2} \times \sqrt{2} \times \sqrt{7}}{2 \times 2} \\ &= \sqrt{7/2}\end{aligned}$$

Rpta. D

Resolución 17

$$\begin{aligned}-2r &> 7 \\ 2r &< -7 \\ r &< \frac{-7}{2} \\ r &< -3,5\end{aligned}$$

∴ r mayor entero = -4

Rpta. B

Resolución 18

$$\begin{aligned}(\pi + \sqrt{10}) : (\sqrt{13} - \sqrt{10}) \\ (3,14 + 3,16) : (3,61 - 3,16) \\ (6,30) : (0,45) \\ 14\end{aligned}$$

Rpta. C

Resolución 19

VFVF

Rpta. D

Resolución 20

$$\begin{aligned}2|7x - 1| - |-26| &= 0 \\ 2|7x - 1| &= |-26| \\ |7x - 1| &= \frac{26}{2} \\ |7x - 1| &= 13 \\ 7x - 1 &= -13 \vee 7x - 1 = 13 \\ 7x &= -12 \vee 7x = 14 \\ x &= -12/7 \vee x = 2 \\ \therefore \text{Solución mayor} &= 2\end{aligned}$$

Rpta. E

Resolución 21

$$\begin{aligned}x &= 4\sqrt[3]{2\sqrt[3]{64}} \\ x &= 4\sqrt[3]{2\sqrt[3]{2 \times 4}} \\ x &= 4\sqrt[3]{2 \times 2} \\ x &= 4\sqrt[3]{4} \\ x &= 4 \times 2 \\ x &= 8\end{aligned}$$

Reemplazando:

$$\begin{aligned}A &= 3\sqrt[3]{8} \cdot 3\sqrt[3]{4\sqrt{8}} \cdot 5\sqrt[3]{4\sqrt{8}} \cdot 6\sqrt[3]{5\sqrt{8}} \\ A &= 6\sqrt{8} \cdot 12\sqrt{8} \cdot 20\sqrt{8} \cdot 30\sqrt{8} \\ A &= 6\sqrt[3]{2^3} \cdot 12\sqrt[3]{2^3} \cdot 20\sqrt[3]{2^3} \cdot 30\sqrt[3]{2^3} = 2^{1/2} \cdot 2^{1/4} \cdot 2^{3/20} \cdot 2^{1/10} \\ A &= 2^{20/20} \\ A &= 2\end{aligned}$$

Rpta. B

Resolución 22

$$\begin{aligned}f &= 1,09 \times 0,53 \div 0,36 \\ f &= \frac{12}{11} \times \frac{53}{99} \div \frac{4}{11} \\ f &= \frac{12}{11} \times \left(\frac{53}{99} \times \frac{11}{4} \right) \\ f &= \frac{12}{11} \times \frac{53}{36} \Rightarrow f = \frac{53}{33} \Rightarrow f = 1,60\end{aligned}$$

Rpta. C

Resolución 23

$$\begin{aligned}|2 - 3x| &= |-5| \\ |2 - 3x| &= 5\end{aligned}$$

$$\begin{aligned}2 - 3x &= -5 \quad \vee \quad 2 - 3x = 5 \\ 7 &= 3x \quad \vee \quad -3 = 3x \\ 7/3 &= x \quad \vee \quad -1 = x\end{aligned}$$

$$\text{Suma: } \frac{7}{3} + -1 = \frac{4}{3} = 1,333 \dots = 1,3$$

Rpta. D

Resolución 24

$$\begin{aligned}\frac{\sqrt{x} + 1}{\sqrt{x} - 1} &= 3 \longrightarrow x = 4 \\ \longrightarrow M &= 4 + 4^2 \\ M &= 20\end{aligned}$$

Rpta. B

Resolución 25

$$\begin{aligned}A &= \sqrt[3]{2\sqrt{2}} = \sqrt[3]{2 \cdot 2^{1/2}} = \sqrt[3]{2^{3/2}} \\ A &= 2^{\frac{3}{3} \cdot \frac{1}{2}} = 2^{\frac{1}{2}} = \sqrt{2} \\ B &= \sqrt[8]{3^4} = \sqrt{3} \\ \longrightarrow A \times B &= \sqrt{2} \times \sqrt{3} = \sqrt{6} = \sqrt[6]{6} \\ \therefore C/D &= 6/2 = 3\end{aligned}$$

Rpta. A

Resolución 26

I. V II. V III. V

Rpta. A

Resolución 27

$$S = \sqrt[3]{2\sqrt{8\sqrt{2\sqrt{2}} \cdot \sqrt{2}}}$$

$$S^3 = 2\sqrt{8\sqrt{4}}$$

$$S^3 = 2\sqrt{8 \times 2}$$

$$S^3 = 2 \times 4 \quad \therefore S^3 = 8$$

Rpta. A

Resolución 28

$$T = \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$$

$$T = 1$$

$$\therefore T^{100} = 1$$

Rpta. B

Resolución 29

$$M = y^{2/3} \cdot y^{2/3} \cdot y^{2/3} \cdot y^{2/3} = y^{8/3}$$

$$M^3 = y^8$$

Rpta. C

Resolución 30

Simplificamos la expresión

$$\frac{1}{3}\sqrt{118} - \frac{2}{5}\sqrt{50} + \frac{3}{4}\sqrt{32}$$

$$= \frac{1}{3} \cdot 3\sqrt{2} - \frac{2}{5} \cdot 5\sqrt{2} + \frac{3}{4} \cdot 4\sqrt{2}$$

$$= \sqrt{2} - 2\sqrt{2} + 3\sqrt{2} = 2\sqrt{2} = \sqrt{8}$$

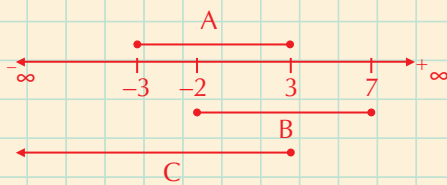
$$\text{Pero } \sqrt[4]{B} = \sqrt{8} \Rightarrow A = 2, B = 8$$

$$\text{Piden } B^A \Rightarrow B^A = 8^2 = 64$$

Rpta. D

Aplica tus aprendizajes 3

Resolución 1



$$(A \cap B) - C$$

$$= [-2; 3] - (-\infty; 3]$$

$$= \{3\}$$

Rpta. D

Resolución 2

$$|1 - \sqrt{2}| + |\sqrt{2} - 3|$$

$$= \sqrt{2} - 1 + 3 - \sqrt{2}$$

$$= 2$$

Rpta. B

Resolución 3

$$\left(\sqrt[4]{\frac{1}{16}} - 2^{-2} - 2^{-3} \right)^{-1/3}$$

$$\left(\frac{1}{2} - \frac{1}{4} - \frac{1}{8} \right)^{-1/3}$$

$$\left(\frac{1}{8} \right)^{-1/3}$$

$$8^{1/3} = \sqrt[3]{8} = 2$$

Rpta. B

Resolución 4

$$A = \sqrt{12} + \sqrt{75} - \sqrt{48}$$

$$A = \sqrt{2^2 \times 3} + \sqrt{5^2 \times 3} - \sqrt{4^2 \times 3}$$

$$A = 2\sqrt{3} + 5\sqrt{3} - 4\sqrt{3}$$

$$A = 3\sqrt{3}$$

$$B = \sqrt[3]{16} + \sqrt[3]{128} - \sqrt[3]{54}$$

$$B = \sqrt[3]{2^3 \times 2} + \sqrt[3]{4^3 \times 2} - \sqrt[3]{3^3 \times 2}$$

$$B = 2\sqrt[3]{2} + 4\sqrt[3]{2} - 3\sqrt[3]{2}$$

$$B = 3\sqrt[3]{2}$$

$$\therefore \sqrt{A^2 + B^3} = \sqrt{(3\sqrt{3})^2 + (3\sqrt[3]{2})^3} = \sqrt{9 \times 3 + 27 \times 2}$$

$$\sqrt{A^2 + B^3} = \sqrt{81} = 9$$

Rpta. B

Resolución 5

$$\left[\frac{81^{3/4}}{32^{2/5} - 27^{1/3}} \right]^{-1/3} = \left[\frac{(3^4)^{3/4}}{(2^5)^{2/5} - (3^3)^{1/3}} \right]^{-1/3}$$

$$= \left[\frac{3^3}{2^2 - 3} \right]^{-1/3} = \left[\frac{27}{4 - 3} \right]^{-1/3} = \left[\frac{27}{1} \right]^{-1/3} = 27^{-1/3}$$

$$\left(\frac{1}{27} \right)^{1/3} = \sqrt[3]{\frac{1}{27}} = \frac{1}{3}$$

$$\frac{1}{3} \quad \text{Rpta. C}$$

Resolución 6

$$\begin{aligned} \frac{1}{\sqrt{5} + \sqrt{3}} &\times \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} - \sqrt{3}} = \frac{\sqrt{5} - \sqrt{3}}{5 - 3} = \frac{\sqrt{5} - \sqrt{3}}{2} \\ \frac{1}{\sqrt{3} + 1} &\times \frac{\sqrt{3} - 1}{\sqrt{3} - 1} = \frac{\sqrt{3} - 1}{3 - 1} = \frac{\sqrt{3} - 1}{2} \\ \frac{1}{4 + 2\sqrt{5}} &\times \frac{4 - 2\sqrt{5}}{4 - 2\sqrt{5}} = \frac{4 - 2\sqrt{5}}{16 - 20} = \frac{4 - 2\sqrt{5}}{-4} \\ &= \frac{2 - \sqrt{5}}{-2} = \frac{-2 + \sqrt{5}}{2} \\ \Rightarrow \frac{\sqrt{5} - \sqrt{3}}{2} &+ \frac{\sqrt{3} - 1}{2} - \frac{(2 + \sqrt{5})}{2} = \frac{\sqrt{5} - 1 + 2 - \sqrt{5}}{2} \\ &= 1/2 \end{aligned}$$

Rpta. A

Resolución 7

$$\begin{aligned} &\frac{(8^6 \sqrt{36}) \cdot (3^9 \sqrt{729})}{6^3 \sqrt{16}} \\ &= \frac{8^6 \sqrt{2^2} \times 3^2 \cdot 3^9 \sqrt{3^6}}{6^3 \sqrt{2^3} \cdot 2} = \frac{8^3 \sqrt{2 \cdot 3} \times 3^3 \sqrt{3^2}}{6 \times 2 \times \sqrt{2}} \\ &= \frac{8^3 \sqrt{2} \times 3^3 \sqrt{3}}{6 \times 2 \sqrt{2}} = 2 \times 3 = 6 \end{aligned}$$

Rpta. D

Resolución 8

$$L = \sqrt[n]{7^{n-4}} \cdot \sqrt[n]{49^{n+2}}$$

$$L = 7^{\frac{n-4}{n}} \cdot (7^2)^{\frac{n+2}{n}}$$

$$L = 7^{\frac{n-4}{n} + \frac{2n+4}{n}}$$

$$L = 7^{\frac{3n}{n}}$$

$$L = 7^3$$

$$L = 343$$

Rpta. E

Resolución 9

$$E = \frac{9^{1/6} \cdot 9^{1/4} \cdot 9^{1/3}}{9^{1/20} \cdot 9^{1/5}} = \frac{9^{9/12}}{9^{5/20}}$$

$$E = 9^{\frac{3}{4} - \frac{1}{4}} = 9^{\frac{2}{4}}$$

$$E = 3$$

Rpta. B

Resolución 10

$$A = (7 - (-5))^2 = 12^2 = 144$$

$$B = \sqrt[12]{2^{36}} = 2^3 = 8$$

$$\sqrt{\frac{2A}{B}} = \sqrt{\frac{2 \times 144}{8}} = \sqrt{36} = 6$$

Rpta. A

Resolución 11

Veamos:

$$* \frac{2 + \sqrt{3}}{2 - \sqrt{3}} \times \frac{2 + \sqrt{3}}{2 + \sqrt{3}} = \frac{(2 + \sqrt{3})^2}{4 - 3} = (2 + \sqrt{3})^2$$

$$* \frac{2 - \sqrt{3}}{2 + \sqrt{3}} \times \frac{2 - \sqrt{3}}{2 - \sqrt{3}} = \frac{(2 - \sqrt{3})^2}{4 - 3} = (2 - \sqrt{3})^2$$

$$\begin{aligned} \Rightarrow \sqrt{(2 + \sqrt{3})^2} &+ \sqrt{(2 - \sqrt{3})^2} \\ &= 2 + \sqrt{3} + 2 - \sqrt{3} = 4 \end{aligned}$$

Rpta. E

Resolución 12

$$A = |2 - \sqrt{5}| \quad B = |3 - \sqrt{5}|$$

$$(A - B)^7 = ((\sqrt{5} - 2) + 3 - \sqrt{5})^7 = 1^7 = 1$$

Rpta. A

Resolución 13

$$\sqrt{3 + 2\sqrt{2}} + \sqrt{1 - \sqrt{2}}^2$$

$$\sqrt{(1 + \sqrt{2})^2} + \sqrt{(\sqrt{2} - 1)^2}$$

$$1 + \sqrt{2} + \sqrt{2} - 1 = 2\sqrt{2}$$

Rpta. C

Resolución 14

$$* \frac{1}{2 - \sqrt{3}} \times \frac{2 + \sqrt{3}}{2 + \sqrt{3}} = \frac{2 + \sqrt{3}}{4 - 3} = 2 + \sqrt{3}$$

$$* \frac{2}{\sqrt{5} + \sqrt{3}} \times \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} - \sqrt{3}} = \frac{2(\sqrt{5} - \sqrt{3})}{5 - 3} = \frac{2(\sqrt{5} - \sqrt{3})}{2} = 5 - \sqrt{3}$$

$$2 + \sqrt{3} + \sqrt{5} - \sqrt{3} = 2 + \sqrt{5}$$

Rpta. B

Resolución 15

$$A = \frac{1}{\sqrt{5}} + \frac{1}{1 + \frac{1}{\sqrt{5}}} - \frac{5}{4}$$

$$A = \frac{\sqrt{5}}{5} + \frac{1}{\frac{\sqrt{5} + 1}{\sqrt{5}}} - \frac{5}{4}$$

$$A = \frac{\sqrt{5}}{5} + \frac{\sqrt{5}}{\sqrt{5} + 1} - \frac{5}{4}$$

$$A = \frac{\sqrt{5}}{5} + \frac{\sqrt{5}(\sqrt{5} - 1)}{4} - \frac{5}{4}$$

$$A = \frac{\sqrt{5}}{5} + \frac{5 - \sqrt{5}}{4} - \frac{5}{4}$$

$$A = \frac{\sqrt{5}}{5} + \frac{5 - \sqrt{5} - 5}{4}$$

$$A = \frac{\sqrt{5}}{5} - \frac{\sqrt{5}}{4} = \frac{4\sqrt{5} - 5\sqrt{5}}{20}$$

$$A = -\frac{\sqrt{5}}{20}$$

Rpta. E

Resolución 16

$$\sqrt[6]{2\sqrt{2} + 3} - \sqrt[3]{1 - \sqrt{2}}$$

$$= \sqrt[3]{1 + \sqrt{2}} - \sqrt[3]{1 - \sqrt{2}}$$

$$= \sqrt[3]{(1 + \sqrt{2})(1 - \sqrt{2})}$$

$$= \sqrt[3]{1 - 2}$$

$$= \sqrt[3]{-1} = -1$$

Rpta. E

Aplica tus aprendizajes 4

$$1 \quad \frac{5 \cdot \cancel{3^2} \cdot \cancel{3^n} \cdot 3^5}{\cancel{3^n} \cdot \cancel{3^2} (3^2 - 3^1 - 1)} = \frac{3^5 \cdot \cancel{5}}{\cancel{5}} = 3^5$$

Rpta. B

$$2 \quad P^2 = \frac{8}{P} \rightarrow P^3 = 8 \rightarrow P = 2$$

$$Q^2 = \frac{27}{Q} \rightarrow Q^3 = 27 \rightarrow Q = 3$$

$$\sqrt{P^2 + Q^2 - 2P} = \sqrt{2^2 + 3^2 - 2(2)}$$

$$\sqrt{P^2 + Q^2 - 2P} = \sqrt{3^2} = 3$$

Rpta. A

$$3 \quad 2^{3x+4} \cdot y = (3^4 - 5^2) \cdot 2^{3x} \cdot 2$$

$$\cancel{2^{3x}} \cdot \cancel{2^4} \cdot y = 56 \cdot \cancel{2^{3x}} \cdot \cancel{2}$$

$$8y = 56 \rightarrow y = 7^1$$

Rpta. A

$$4 \quad A = b \cdot h$$

$$\cancel{2} \cdot \cancel{56} \cdot 8^x = \cancel{16} \cdot 2^{3x} \cdot h$$

$$7 \cdot 8^x = 2^{3x} \cdot h$$

$$\frac{7 \cdot 8^x}{2^{3x}} = h \rightarrow h = 7$$

Rpta. C

$$5 \quad P = \sqrt{x \cdot P}$$

$$Q = \sqrt{y \cdot Q}$$

$$P^2 = x \cdot P$$

$$Q^2 = y \cdot Q$$

$$P = x$$

$$Q = y$$

$$\therefore \frac{P}{x} + \frac{Q}{y} = \frac{x}{x} + \frac{y}{y} = 1 + 1 = 2$$

Rpta. C

$$6 \quad (2^{10} + 8^2)x = 2^{14} + 4^5$$

$$(2^{10} + 2^6)x = 2^{14} + 2^{10}$$

$$2^6(\cancel{2^4} + 1)x = 2^{10}(\cancel{2^4} + 1)$$

$$x = \frac{2^{10}}{2^6}$$

$$x = 2^4 \rightarrow x = 16$$

Rpta. B

$$7 \quad A) F \quad B) F \quad C) V \quad D) F$$

Rpta. A

$$8 \quad 2 \cdot 2^{-1} \cdot 3 \cdot 3^{-1} \cdot 4 \cdot 4^{-1} \cdot 5 \cdot 5^{-1} = 1$$

$$2^0 \cdot 3^0 \cdot 4^0 \cdot 5^0 = 1$$

$$1 \cdot 1 \cdot 1 \cdot 1 = 1$$

$$1 = 1$$

Rpta. A

$$9 \quad \frac{5^n + 2^n}{5^{-n} + 2^{-n}} = \frac{(5^n + 2^n)10^n}{(2^n + 5^n)} = 10^n$$

Rpta. B

$$10 \quad 64^{-27-3-5^0} = 64^{-27-3-1} = 64^{-27-\frac{1}{3}}$$

$$64^{-\frac{1}{3}} = \frac{1}{4}$$

Rpta. C

11 $(x^{3x})^a = x^{12x} \rightarrow a = 4$

Rpta. B

12 $a^7 \cdot (a^3)^4 \cdot a^{1^5} \cdot (a^{-4})^6 \cdot a^{2^0}$
 $a^7 \cdot a^{12} \cdot a \cdot a^{-24} \cdot a^2 = a^{-2}$

Rpta. D

$\therefore$ El exponente final de a es -2 .

13 $3a\sqrt{x} \cdot 2a\sqrt{x} = x^{\frac{5}{12}}$
 $\frac{\frac{5}{6a}}{\frac{5}{12}} = \frac{5}{12}$
 $\frac{5}{6a} = \frac{5}{12} \rightarrow a = 2$

Rpta. B

14 $81x^{2n} + x^{-2n} ; x^{-n} = 9$
 $81(x^{-n})^{-2} + (x^{-n})^2$
 $81 \cdot 9^{-2} + 9^2 = 82$

Rpta. C

15 $M = \sqrt[3]{\frac{8}{\sqrt[3]{\frac{8}{\sqrt[3]{\frac{8}{\vdots}}}}}}$
 $M^2 = \frac{8}{M} \rightarrow M^3 = 8 \rightarrow M = 2$
 $\therefore 4 + M = 6$

Rpta. B

16 $R = \frac{x^{12} \cdot [(x^{-3})^4]^{-3}}{[(x^{-6})^3]^2} = \frac{x^{12} \cdot x^{36}}{x^{36}} = (x^2)^6$

$\therefore$ El exponente es 6.

Rpta. B

17 $5a\sqrt{x} \cdot 2a\sqrt{x^3} = x^{\frac{17}{20}}$
 $\frac{1}{5a} \cdot \frac{3}{2a} = x^{\frac{17}{20}}$
 $\frac{1}{5a} + \frac{3}{2a} = \frac{17}{20}$
 $\frac{17}{10a} = \frac{17}{20} \rightarrow a = 2$

Rpta. B

18 $2^2 = (2^2)^x$
 $2^{16} = 2^{2x}$

$2x = 16 \rightarrow x = 8$

Rpta. D

19 $\sqrt[10]{5 \cdot \sqrt{5} \cdot \dots \sqrt{5} \cdot \sqrt{5} \cdot \sqrt{25}}$
 $\dots \sqrt{5 \sqrt{5} \sqrt{25}}$
 $\dots \sqrt{5 \cdot 5} = 5$

Rpta. B

20 $\sqrt[6]{8} = n\sqrt[2]{2n}$
 $\sqrt{2} = n\sqrt{2n}$

$\sqrt[8]{2 \cdot 8} = n\sqrt[2]{2n} \rightarrow n = 8$

$\therefore \sqrt{n+1} = 3$

Rpta. D

21 $\frac{\sqrt[120]{\sqrt{x} \cdot 5\sqrt{y} \cdot \sqrt{x} \cdot 5\sqrt{y} \cdot \dots \cdot \sqrt{x} \cdot 5\sqrt{y}}}}{\sqrt[30]{\sqrt[3]{x\sqrt{y}} \cdot \sqrt[3]{x\sqrt{y}} \cdot \dots \cdot \sqrt[3]{x\sqrt{y}}}} = \frac{x^{15} \cdot y^6}{x^{10} \cdot y^5} = x^5 \cdot y$

Rpta. B

22 $K = \sqrt{19 + \sqrt{6 \cdot \sqrt{6 \cdot \sqrt{6 \cdot \dots}}}}$
 $K = \sqrt{19 + \sqrt{6(k^2 - 19)}}$
 $(k^2 - 19)^2 = 6k^2 - 114$
 $k^4 - 44k^2 + 475 = 0$
 $K = 5$

Rpta. C

23 $A = \sqrt{13 \cdot \sqrt{13 \cdot \sqrt{13 \cdot \dots}}}$
 $A^2 = 13A \rightarrow A = 13$
 $B = \sqrt{3 \cdot \sqrt{3 \cdot \sqrt{3 \cdot \dots}}}$
 $B^2 = 3B \rightarrow B = 3$
 $\therefore \sqrt{A+B} = 4$

Rpta. D

$$\begin{aligned} 24) \quad A &= \sqrt[4]{64} \\ A^2 &= \frac{64}{A} \rightarrow A = 4 \end{aligned}$$

$$\begin{aligned} B &= \sqrt[4]{125} \\ B^2 &= \frac{125}{B} \rightarrow B = 5 \\ \therefore \sqrt{A+B} &= \sqrt{4+5} = \sqrt{9} = 3 \end{aligned}$$

Rpta. B

$$\begin{aligned} 25) \quad A &= 64^{-36 \cdot -2^{-1}} + 32^{-25 \cdot -2^{-1}} \\ A &= 64^{-\frac{1}{2}} + 32^{-\frac{1}{2}} \\ A &= 64^{-\frac{1}{6}} + 32^{-\frac{1}{5}} \\ A &= \left(\frac{1}{64}\right)^{\frac{1}{6}} + \left(\frac{1}{32}\right)^{\frac{1}{5}} \\ A &= \frac{1}{2} + \frac{1}{2} = 1 \rightarrow A = 1 \therefore A^{10} = 1^{10} = 1 \end{aligned}$$

Rpta. C

Aplica tus aprendizajes 5

$$1) \quad A) F \quad B) F \quad C) F \quad D) V$$

Rpta. C

$$\begin{aligned} 2) \quad \frac{A \cdot B}{C \cdot D} &= \frac{2^{16} \cdot 16^{16}}{8^4 \cdot 4^8} \\ &= \frac{2^{16} \cdot 2^{64}}{2^{12} \cdot 2^{16}} = 2^{64-12} = 2^{52} \\ \rightarrow 2^{52} \cdot \frac{1}{2^{56}} &= \frac{1}{2^4} = \frac{1}{16} \end{aligned}$$

Rpta. B

$$3) \quad a) 3^{600+350+^{-850}} = 3^{100}$$

$$b) \left(-\frac{1}{5}\right)^{4+6+^{-4}} = \frac{1}{5^6}$$

$$c) 6^{4+^{-3}+1} = 6^2 = 36$$

$$\therefore \text{La mayor es } 3^{100}$$

Rpta. A

$$4) \quad M = (5 \cdot 1)^2 \cdot 2^2$$

$$M = 25 \cdot 4$$

$$M = 100$$

Rpta. B

$$5) \quad a) 3^{14}$$

$$b) 0,5^{-1} = \left(\frac{1}{2}\right)^{-1} = 2$$

$$c) \left(-\frac{1}{4}\right)^1 = -\frac{1}{4}$$

$$d) (-10)^{7-5} = (-10)^2 = 100$$

$$e) \left(-\frac{1}{2}\right)^{6-4} = \left(-\frac{1}{2}\right)^2 = \frac{1}{4}$$

$$f) 2^{28-26} = 2^2 = 4$$

$$g) 3^{-8-^{-6}} = 3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

$$h) \left(\frac{1}{4}\right)^{3+^{-4}} = \left(\frac{1}{4}\right)^{-1} = 4$$

$$i) \left(\frac{-2}{-8}\right)^{-3} = \left(\frac{8}{2}\right)^3 = \frac{8 \cdot 8 \cdot 8}{8} = 64$$

$$j) \frac{(-2)^5}{2^3} = \frac{-32}{8} = -4$$

$$k) 3^{-2-2} \cdot 3^5 = 3^{-4} \cdot 3^5 = 3^1 = 3$$

$$l) \frac{7^{-4} \cdot 7^6}{7^3} = \frac{7^{-4+6}}{7^3} = \frac{7^2}{7^3} = 7^{-1} = \frac{1}{7}$$

$$6) \quad a) \frac{6^{10} \div 6^4 \cdot 6^6}{6^6} = \frac{6^6 \cdot 6^6}{6^6} = 6^{12}$$

$$\begin{aligned} b) (-4y)^{-5-^{-3}} &= (-4y)^{-5+3} = (-4y)^{-2} \\ &= \left(\frac{1}{-4y}\right)^2 = \frac{1}{16y^2} \end{aligned}$$

$$\begin{aligned} c) (10m)^{6-2} &= (10m)^4 = 10^4 \cdot m^4 = (5 \cdot 2)^4 m^4 \\ &= 5^4 \cdot 2^4 \cdot m^4 = 2^4 \cdot 5^4 \cdot m^4 \end{aligned}$$

$$d) (\sqrt{2}x)^{5+^{-3}+^{-2}} = (\sqrt{2}x)^0 = 1$$

$$e) 5^7 \cdot 5^{12} \cdot 5^{-8} \cdot 2^{-8} \cdot 2^7 = 5^{11} \cdot 2^{-1}$$

$$f) \frac{3^{48}}{3^{24}} \cdot \frac{1}{3^{22}} = \frac{3^{48}}{3^{46}} = 3^2 = 9$$

$$g) 3^{14} \cdot \frac{1}{3^{12}} \cdot 2^{16} \cdot \frac{1}{2^{15}} = 3^2 \cdot 2^1 = 18$$

$$h) 7^5 y^5 \cdot \frac{1}{y^6} \cdot 7^{-3} = 7^2 y^{-1} = 49y^{-1}$$

7 a) $5\sqrt{215^5} = 215$

b) $\sqrt{19^2} = 19$

c) $4\sqrt{(0,6)^{12}} = 0,6^3 = 0,216$

d) $5\sqrt{12^{-8}} = 12^{-\frac{8}{5}}$

e) $5\sqrt{5^{\frac{3}{2}}} = 5^{\frac{3}{2} \cdot \frac{2}{5}} = 5^{\frac{3}{5}}$

f) $8\sqrt{16^{-4}} = 8\sqrt{2^{-16}} = 2^{-2} = \frac{1}{4}$

8 a) $\sqrt{\frac{36}{144}} = \frac{6}{12} = \frac{1}{2}$

b) $5\sqrt{\frac{1}{1024}} = 5\sqrt{\frac{1}{2^{10}}} = \frac{1}{2^2} = \frac{1}{4}$

c) $3\sqrt{0,125} = 0,5$

d) $5\sqrt{0,00032} = 0,2$

e) $3\sqrt{\frac{64}{1000}} = \frac{4}{10} = \frac{2}{5}$

f) $5\sqrt{3\sqrt{32}} = 15\sqrt{2^5} = 3\sqrt{2}$

g) $3\sqrt{8} \cdot 3\sqrt{27} \cdot 3\sqrt{1000} = 2 \cdot 3 \cdot 10 = 60$

h) $4\sqrt{2} \cdot 4\sqrt{2^3} \cdot 2 = 2^{\frac{1}{4}} \cdot 2^{\frac{3}{4}} \cdot 2^1 = 2^2 = 4$

i) $3\sqrt{128} \cdot 3\sqrt{4} \cdot 3\sqrt{2} = 3\sqrt{2^7} \cdot 3\sqrt{2^2} \cdot 3\sqrt{2^1}$

$$= 2^{\frac{7}{3} + \frac{2}{3} + \frac{1}{3}} = 2^{\frac{10}{3}}$$

$$j) 5\sqrt{2^5 \sqrt{2^4 \cdot 5 \sqrt{2^5}}} = 5\sqrt{2^5 \sqrt{2^4 \cdot 2^1}}$$

$$= 5\sqrt{2 \cdot 2} = 5\sqrt{2^2} = 2^{\frac{2}{5}}$$

k) $\left(3\sqrt[3]{4^3}\right)\left(3\sqrt[3]{2^3}\right)^{-1} = 4 \cdot \frac{1}{2} = 2$

l) $(30\sqrt{x})^{10} \cdot (8\sqrt{x})^{-2} = x^{\frac{10}{3}} \cdot x^{-\frac{1}{4}} = x^{\frac{1}{12}}$

9 a) $\frac{9 \cdot 5 \cdot 10^{-4} \cdot 10^4}{8 \cdot 10^2} = \frac{45}{8 \cdot 10^2} = \frac{45}{8} \cdot 10^{-2}$

b) $\frac{2 \cdot 3 \cdot 4 \cdot 10^{-6} \cdot 10^{-8} \cdot 10^{-3}}{6 \cdot 2 \cdot 10^{-5} \cdot 10^{-7} \cdot 10^{-4}} = \frac{2 \cdot 10^{-17}}{10^{-16}}$
 $= 2 \cdot 10^{-1} = \frac{2}{10} = \frac{1}{5}$

c) $\frac{3 \cdot 10^{-3} \cdot 5 \cdot 10^{-2}}{15 \cdot 10^{-4}} = 10^{-5} \cdot 10^4 = 10^{-1} = \frac{1}{10}$

d) $\frac{24 \cdot 10^{-3} \cdot 36 \cdot 10^{-4}}{8 \cdot 10^{-2} \cdot 12 \cdot 10^{-4}} = \frac{9 \cdot 10^{-3}}{10^{-2}} = 9 \cdot 10^{-1} = \frac{9}{10}$

e) $\frac{24 \cdot 10^{-7} \cdot 21 \cdot 10^4}{12 \cdot 10^3 \cdot 21 \cdot 10^{-6}} = \frac{2 \cdot 10^{-3}}{10^{-3}} = 2$

10 I) H II) G III) F IV) E
 V) D VI) C VII) B VIII) A

11 $\left[\frac{4\sqrt{5^2} + 2\sqrt{4}\sqrt{5} + 6\sqrt{5^3}}{3\sqrt{2^4} + 6\sqrt{2^2} + 3\sqrt{2 \cdot 3^3}} \right]^6$

$$\left(\frac{\sqrt{5} + 4\sqrt{5} + \sqrt{5}}{2\sqrt{2} + 3\sqrt{2} + 3\sqrt{2}} \right)^6$$

$$\frac{(6\sqrt{5})^6}{(6\sqrt{2})^6} = \frac{6^6 \cdot 5^3}{6^6 \cdot 2^2} = \frac{125}{4}$$

Rpta. D

Aplica tus aprendizajes 6

$$1 \quad \frac{5^{m+1} - 5^m}{4 \cdot 5^m} = \frac{5^m(5-1)}{4 \cdot 5^m} = 1$$

Rpta. A

$$2 \quad (2^2)^3 - (-2)^4 - (-2)^5 \\ 2^6 - 2^4 + 2^5 = 80$$

Rpta. C

$$3 \quad \left[\frac{2^{a+3} + 2^a}{3^{a+2}} \right]^{\frac{1}{a}} ; a \neq 0 \quad 0 \\ \left[\frac{2^a \cdot 8 + 2^a}{3^a \cdot 9} \right]^{\frac{1}{a}} = \frac{2}{3}$$

Rpta. B

$$4 \quad \frac{5^n + 2^n}{5^{-n} + 2^{-n}} = \frac{(\cancel{5^n} + 2^n) \cdot 10^n}{(\cancel{2^n} + 5^n)} = 10^n$$

Rpta. B

$$5 \quad \left(\sqrt{\sqrt{2\sqrt{2}}} \right)^8 = (2\sqrt{2})^2 = 8$$

Rpta. C

$$6 \quad \frac{(7^{-1})^{-1} \cdot 3\sqrt{(5^6/10)^5}}{(2+4+6+8+10)^0}$$

$$7 \cdot \sqrt[3]{5^3} = 7 \cdot 5 = 35$$

Rpta. B

$$7 \quad \frac{\overbrace{\sqrt{x} \cdot \sqrt[3]{y} \cdot \sqrt{x} \cdot \sqrt[3]{y} \cdot \dots \cdot \sqrt{x} \cdot \sqrt[3]{y}}}^{60 \text{ factores}}}{\underbrace{\sqrt{xy} \cdot \sqrt{xy} \cdot \dots \cdot \sqrt{xy}}_{20 \text{ veces}}}$$

$$\frac{(\sqrt{x})^{30} \cdot (3\sqrt[3]{y})^{30}}{(\sqrt{xy})^{20}} = \frac{x^{15} \cdot y^{10}}{x^{10} \cdot y^{10}} = x^5$$

Rpta. C

$$8 \quad \left[\left(\frac{2}{3} \right)^{-2} + \left(\frac{4}{3} \right)^{-1} \right]^2 \cdot \frac{1}{3^{-4}}$$

$$\left[\frac{9}{4} + \frac{3}{4} \right]^2 \cdot 81 = \frac{1}{9} \cdot 81 = 9$$

Rpta. B

$$9 \quad 4^{4^{-2^{-1}}} = 4^{\frac{1}{2}} \\ = 4^{\frac{1}{2}} = 2$$

Rpta. A

$$10 \quad \frac{4^{-7} \cdot 4^6 \cdot 4^{10}}{2^{20} \cdot 16^{-2}} = \frac{4^9}{4^{10} \cdot 4^{-4}} = 4^3 = 64 \quad \text{Rpta. B}$$

$$11 \quad \frac{(3^4 - 5^2) \cdot 8^x \cdot 2}{2^{3x+4}} = \frac{56 \cdot 2 \cdot 8^x}{8^x \cdot 16} = 7 \quad \text{Rpta. B}$$

$$12 \quad x^2 \cdot \sqrt{x\sqrt{x^n}} = x^2 \cdot (x \cdot x^{n/2})^{1/2} \\ 2 + \frac{1}{2} + \frac{n}{4} = 4 \Rightarrow \frac{n}{4} = \frac{3}{2} \Rightarrow n = 6 \quad \text{Rpta. C}$$

$$13 \quad \frac{2^{14} + 4^5}{2^{10} + 8^2} = \frac{2^{14} + 2^{10}}{2^{10} + 2^6} = \frac{2^{10}(\cancel{2^4} + 1)}{2^6(\cancel{2^4} + 1)} \\ = 2^4 = 16 \quad \text{Rpta. E}$$

$$14 \quad \frac{\left(\frac{9}{2}\right)^{-1} + \left(\frac{3}{5}\right)^{-2}}{\left(\frac{3}{2}\right)^{-2} + \left(\frac{25}{81}\right)^{0.5}} = \frac{\frac{2}{9} + \frac{25}{9}}{\frac{4}{9} + \frac{5}{9}} = 3 \quad \text{Rpta. C}$$

$$15 \quad \frac{5(3^{n+5})}{3^{n+4} - 3^{n+3} - 3^{n+2}} = \frac{5 \cdot \cancel{3^n} \cdot 3^5}{\cancel{3^n}(3^4 - 3^3 - 3^2)} \\ = \frac{\cancel{5} \cdot 3^5}{\cancel{5} \cdot 3^2} = 27 \quad \text{Rpta. D}$$

$$16 \quad \left(\frac{25}{81}\right)^{-32}^{-\frac{1}{5}} = \left(\frac{25}{81}\right)^{-\frac{1}{2}} \quad \left(\frac{81}{25}\right)^{\frac{1}{2}} = \frac{9}{5} \quad \text{Rpta. D}$$

$$17 \quad A = 16^{-4-1} = 16^{-\frac{1}{4}} = \left(\frac{1}{16}\right)^{\frac{1}{4}} = \frac{1}{2}$$

$$B = 64^{-4-\frac{1}{2}} = \left(-\frac{1}{4}\right)^{\frac{1}{2}} = 64^{-\frac{1}{2}} = \left(\frac{1}{64}\right)^{\frac{1}{2}} = \frac{1}{8}$$

$$A \cdot B^{-1} = \frac{1}{2} \cdot \left(\frac{1}{8}\right)^{-1} = \frac{1}{2} \cdot 8 = 4 \quad \text{Rpta. B}$$

$$18 \quad 5\sqrt[5]{9^x} = 3^x \cdot 5\sqrt[5]{27} \\ 3^{\frac{2x}{5}} = 3^x \cdot 3^{\frac{3}{5}} \Rightarrow 3^{\frac{2x}{5}} = 3^{x+\frac{3}{5}} \Rightarrow \frac{2x}{5} = x + \frac{3}{5} \\ \frac{2x}{5} - x = \frac{3}{5} \Rightarrow \frac{-3x}{5} = \frac{3}{5} \Rightarrow -3x = 3 \Rightarrow x = -1$$

Rpta. B

UNIDAD 2

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 1

$$\frac{63}{54} = \frac{7}{x} \Rightarrow x = \frac{54 \cdot 7}{63}$$

$$\therefore x = 6 \quad \text{Rpta D}$$

Resolución 2

$$\frac{x+7}{x-7} = \frac{10}{3}$$

$$3(x+7) = 10(x-7)$$

$$3x + 21 = 10x - 70$$

$$\therefore x = 13 \quad \text{Rpta A}$$

Resolución 3

$$\frac{x}{0,6} = \frac{10}{0,4} \Rightarrow x = \frac{x}{6} = \frac{10}{4}$$

$$x = 6 \cdot \frac{10}{4}$$

$$\therefore x = 15 \quad \text{Rpta C}$$

Resolución 4

$$\frac{\sqrt{x}+2}{\sqrt{x}-2} = \frac{4}{3}$$

$$3(\sqrt{x}+2) = 4(\sqrt{x}-2)$$

$$3\sqrt{x} + 6 = 4\sqrt{x} - 8$$

$$\sqrt{x} = 14$$

$$\therefore x = 196 \quad \text{Rpta B}$$

Resolución 5

$$\frac{a}{8} = \frac{b}{5} = k \Rightarrow \begin{matrix} a = 8k \\ b = 5k \end{matrix} \dots (I)$$

$$\text{Pero: } a - b = 57 \dots (II)$$

Reemplazamos (I) e (II)

$$8k - 5k = 57 \Rightarrow \boxed{k = 19}$$

En (I):

$$a = 8 \cdot 19 \Rightarrow \boxed{a = 152}$$

$$b = 5 \cdot 19 \Rightarrow \boxed{b = 95}$$

Luego:

$$a + b = 152 + 95 \therefore a + b = 247 \quad \text{Rpta A}$$

Resolución 6

$$a = 2k$$

$$\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = k \Rightarrow b = 3k \dots (I)$$

$$c = 4k$$

$$\text{Pero: } a \cdot b \cdot c = 192 \dots (II)$$

Reemplazamos (I) en (II)

$$2k \cdot 3k \cdot 4k = 192$$

$$k^3 = 8 \Rightarrow k = 2$$

En (I):

$$a = 2 \cdot 2 \Rightarrow \boxed{a = 4}$$

$$b = 3 \cdot 2 \Rightarrow \boxed{b = 6}$$

$$c = 4 \cdot 2 \Rightarrow \boxed{c = 8}$$

Luego:

$$a + b - c = 4 + 6 - 8 = 2$$

$$\therefore a + b - c = 2 \quad \text{Rpta B}$$

Resolución 7

$$\frac{a}{2} = \frac{b}{3} = k \Rightarrow \begin{matrix} a = 2k \\ b = 3k \end{matrix} \dots (I)$$

$$\text{Pero: } a + b = 35 \dots (II)$$

Reemplazamos (I) en (II)

$$2k + 3k = 35$$

$$5k = 35 \Rightarrow k = 7$$

$$\text{En (I): } a = 2 \cdot 7 \Rightarrow a = 14$$

$$b = 3 \cdot 7 \Rightarrow b = 21$$

$$\text{Luego: } b - a = 21 - 14 = 7 \therefore b - a = 7$$

Rpta C

Resolución 8

$$\frac{x}{3} = \frac{y}{2} = z \Rightarrow \begin{matrix} x = 3z \\ y = 2z \end{matrix} \dots (I)$$

$$\text{Pero: } x \cdot y \cdot z = 6^4 \dots (II)$$

Reemplazamos (I) en (II)

$$3z \cdot 2z \cdot z = 6^4$$

$$6z^3 = 6^4 \Rightarrow z = 6$$

En (I):

$$x = 3 \cdot 6 \Rightarrow x = 18$$

$$y = 2 \cdot 6 \Rightarrow y = 12$$

Luego:

$$x + y + z = 18 + 12 + 6$$

$$\therefore x = 36 \quad \text{Rpta A}$$

Resolución 9

$$\frac{a}{2} = \frac{b}{5} = \frac{c}{3} = k \Rightarrow \begin{aligned} a &= 2k \\ b &= 5k \dots (I) \\ c &= 3k \end{aligned}$$

Pero: $a^2 + b^2 + c^2 = 152 \dots (II)$

Reemplazamos (I) en (II)

$$(2k)^2 + (5k)^2 + (3k)^2 = 152$$

$$4k^2 + 25k^2 + 9k^2 = 152$$

$$k^2 = 4 \Rightarrow \boxed{k = 2}$$

En (I):

$$a = 2 \cdot 2 \Rightarrow a = 4$$

$$b = 5 \cdot 2 \Rightarrow b = 10$$

$$c = 3 \cdot 2 \Rightarrow c = 6$$

Luego:

$$a + b + c = 4 + 10 + 6$$

$$\therefore a + b + c = 20 \quad \text{Rpta A}$$

Resolución 10

$$\frac{a}{5} = \frac{b}{3} = \frac{c}{6} = k \Rightarrow \begin{aligned} a &= 5k \\ b &= 3k \dots (I) \\ c &= 6k \end{aligned}$$

Pero: $a + c = 66 \dots (II)$

Reemplazamos (I) en (II)

$$5k + 6k = 66 \Rightarrow \boxed{k = 6}$$

En (I):

$$a = 5 \cdot 6 \Rightarrow a = 30$$

$$b = 3 \cdot 6 \Rightarrow b = 18$$

$$c = 6 \cdot 6 \Rightarrow c = 36$$

$$\therefore b = 18 \quad \text{Rpta C}$$

Resolución 11

$$\frac{a+1}{2} = \frac{b+2}{3} = k$$

i) $\frac{a+1}{2} = k \Rightarrow \boxed{a = 2k - 1}$

ii) $\frac{b+2}{3} = k \Rightarrow \boxed{b = 3k - 2}$

Pero: $a + b + 3 = 20 \dots (II)$

Reemplazamos (I) en (II)

$$(2k - 1) + (3k - 2) + 3 = 20$$

$$5k = 20 \Rightarrow \boxed{k = 4}$$

De (I):

$$a = 2 \cdot 4 - 1 \Rightarrow a = 7$$

Rpta B

Resolución 12

$$\frac{x}{5} = \frac{y}{10} = \frac{z}{15} = \frac{p}{20}$$

Por propiedad:

$$\frac{x+y+z+p}{5+10+15+20} = \frac{p}{20} \dots (I)$$

Pero: $x + y + z + p = 30 \dots (II)$

Reemplazamos (II) en (I):

$$\frac{30}{5+10+15+20} = \frac{p}{20}$$

$$\therefore p = 12 \quad \text{Rpta D}$$

Resolución 13

$$\frac{17}{A} = \frac{19}{B} = \frac{21}{C}$$

Por propiedad: $\frac{A}{17} = \frac{B}{19} = \frac{C}{21} = k$

$$A = 17k$$

$$B = 19k \dots (I)$$

$$C = 21k$$

Pero: $A + 2B + C = 152 \dots (II)$

Reemplazamos (I) en (II)

$$17k + 2 \cdot 19k + 21k = 152$$

$$k = 2$$

En (I):

$$A = 17 \cdot 2 \Rightarrow A = 34$$

$$B = 19 \cdot 2 \Rightarrow B = 38$$

$$C = 21 \cdot 2 \Rightarrow C = 42$$

Luego:

$$A + B + C = 34 + 38 + 42$$

$$\therefore A + B + C = 114 \quad \text{Rpta B}$$

Resolución 14

$$\frac{a^2}{4} = \frac{b^2}{25} \Rightarrow \frac{a}{2} = \frac{b}{5}$$

Por propiedad: $\frac{a+b}{2+5} = \frac{a}{2} \dots (I)$

Pero: $a + b = 28 \dots (II)$

Reemplazamos (I) en (II)

$$\frac{28}{2+5} = \frac{a}{2} \Rightarrow \boxed{a = 8}$$

$$\therefore a = 8 \quad \text{Rpta B}$$

Resolución 15

$$\frac{1,5}{2,4} = \frac{15}{a} = \frac{b}{c}$$

Por propiedad: $\frac{15}{24} = \frac{15}{a} = \frac{b}{c} \dots (\alpha)$

$$\Rightarrow a = 24 \Rightarrow 24 + b + c = 37$$

$$\therefore b + c = 13 \quad \text{Rpta C}$$

Resolución 16

$$\frac{a}{3} = \frac{b}{15} = \frac{c}{0,6} = \frac{d}{12} = \frac{e}{1,4} = k$$

$$a = 3k$$

$$b = 15k$$

$$c = 0,6k \dots (I)$$

$$d = 12k$$

$$e = 1,4k$$

Pero: $a + b + c + d + e = 64$

$$32k = 64 \Rightarrow k = 2$$

En (I):

$$a = 3 \cdot 2 \Rightarrow a = 6$$

$$b = 15 \cdot 2 \Rightarrow b = 30$$

$$c = 0,6 \cdot 2 \Rightarrow c = 1,2$$

$$d = 12 \cdot 2 \Rightarrow d = 24$$

$$e = 1,4 \cdot 2 \Rightarrow e = 2,8$$

Luego:

$$a + b - d = 6 + 30 - 24 = 12$$

Rpta C

Aplica tus aprendizajes 2

Resolución 1 $\frac{a}{b} = \frac{c}{d}$

a) "d" es la tercera proporcional **(incorrecto)**
Lo correcto es "d" es la cuarta proporcional.

b) "b" es la media proporcional **(incorrecto)**
Lo correcto es "b" es el primer consecuente.

c) $a \cdot c = b \cdot d$ **(incorrecto)**
Lo correcto es $a \cdot d = b \cdot c$

d) "c" es el primer antecedente **(incorrecto)**
Lo correcto es "c" es el segundo antecedente.

e) "b" y "d" son los consecuentes **(correcto)**

Resolución 2

$$\frac{a}{b} = \frac{b}{c}$$

a) "c" es la cuarta proporcional **(incorrecto)**
Lo correcto es "c" es la tercera proporcional.

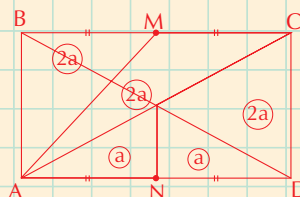
b) Es una proporción discontinua **(incorrecto)**
Lo correcto es una proporción continua.

c) "b" es la media proporcional **(correcto)**

d) "a" y "b" son los extremos **(incorrecto)**
Lo correcto es "a" y "c" son los extremos.

e) $b^3 = a \cdot d$ **(incorrecto)**
Lo correcto es $b^2 = a \cdot c$

Resolución 3

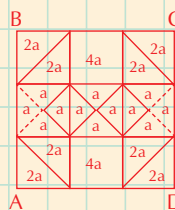


$$\text{Parte} = \frac{\text{Parte pintada}}{\text{Área total}}$$

$$\text{Parte} = \frac{3a^2}{8a^2} = \frac{3}{8}$$

Rpta B

Resolución 4

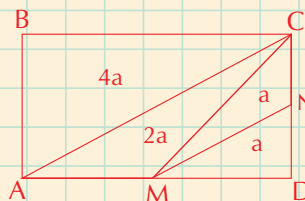


$$\text{Parte} = \frac{\text{Parte coloreada}}{\text{Área total}}$$

$$\text{Parte} = \frac{12a^2}{36a^2} = \frac{1}{3}$$

Rpta D

Resolución 5

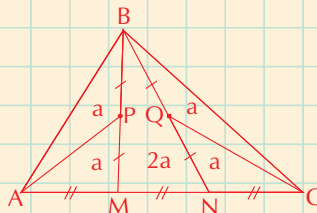


$$\text{Parte} = \frac{\text{Área pintada}}{\text{Área rectángulo}}$$

$$\text{Parte} = \frac{3a^2}{8a^2} = \frac{3}{8}$$

Rpta E

Resolución 6

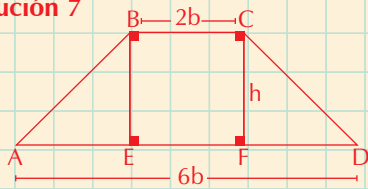


$$\text{Relación} = \frac{\text{Área pintada}}{\text{Área total}}$$

$$\text{Relación} = \frac{2a^2}{6a^2} = \frac{1}{3}$$

Rpta B

Resolución 7

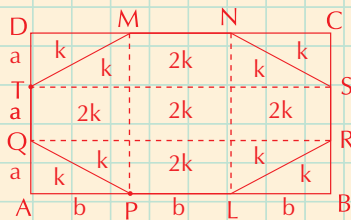


$$\text{Relación} = \frac{\text{Región pintada}}{\text{Área total}}$$

$$\text{Relación} = \frac{2b \cdot h}{\left(\frac{2b + 6b}{2}\right)h} = \frac{2b \cdot h}{4b \cdot h} = \frac{2}{4} = \frac{1}{2}$$

Rpta A

Resolución 8



$$\text{Relación} = \frac{\text{Área del octógono}}{\text{Área del rectángulo}}$$

$$\text{Relación} = \frac{14k}{18k} = \frac{7}{9}$$

Rpta A

Aplica tus aprendizajes 3

Resolución 1

Número de caramelos de fresa = $1k$

Número de caramelos de limón = $3k$

Del enunciado:

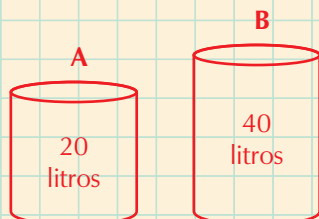
$$1k + 3k = 80$$

$$k = 20$$

Luego:

$$\begin{aligned} \text{Número de caramelos de fresa} &= 1k \\ &= 20 \end{aligned}$$

Resolución 2



En el Recipiente "A" quedan 15 litros.

En el Recipiente "B" hay 45 litros.

Luego:

$$\frac{A}{B} = \frac{15}{45} = \frac{1}{3}$$

∴ La relación es de 1 a 3

Rpta A

Resolución 3

$$\text{Número de Platanos} = 2k = 24 \Rightarrow k = 12$$

$$\text{Número de Manzanas} = 1k$$

Luego:

$$\begin{aligned} \text{Número de Manzanas} &= 1k \\ &= 12 \end{aligned}$$

Rpta B

Resolución 4

$$*) \frac{\text{Patos}}{\text{Conejos}} = \frac{3}{2} = \frac{3k}{2k}$$

$$**) \frac{\text{Conejos}}{\text{Gallinas}} = \frac{1 \times 2}{2 \times 2} = \frac{2k}{4k}$$

De enunciado:

$$3k = 12 \Rightarrow k = 4$$

Luego:

$$\begin{aligned} \text{Número de Gallinas} &= 4k \\ &= 16 \end{aligned}$$

Rpta B

Resolución 5

$$\frac{\text{Edad de Ana}}{\text{Edad de Betty}} = \frac{5}{4} = \frac{5k}{4k}$$

$$\frac{\text{Edad de Betty}}{\text{Edad de Cecilia}} = \frac{2 \times 2}{1 \times 2} = \frac{4k}{2k}$$

Del enunciado:

$$2k = 16 \text{ años}$$

$$k = 8 \text{ años}$$

$$\text{Edad de Ana} = 5k = 40 \text{ años}$$

Rpta C

Resolución 6

$$\frac{\text{Libros de Matemática}}{\text{Libros de Física}} = \frac{3}{4} = \frac{3k}{4k}$$

$$\frac{\text{Libros de Biología}}{\text{Libros de Física}} = \frac{3 \times 2}{2 \times 2} = \frac{6k}{4k}$$

Del enunciado:

$$3k = 18 \Rightarrow k = 6$$

Luego:

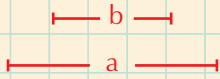
$$\begin{aligned} \text{Libros de Biología} &= 6k \\ &= 6 \cdot 6 \\ &= 36 \end{aligned}$$

Rpta D

Resolución 7

$$*) \frac{b}{a} = \frac{3k}{4k}$$

$$\text{Relación} = \frac{\text{Área pintada}}{\text{Área del } \square \text{ mayor}}$$



$$\text{Relación} = \frac{(3k)^2}{(4k)^2} = \frac{9}{16}$$

Rpta C

Resolución 8

$$720 \begin{cases} a \\ b \end{cases} \Rightarrow \frac{a}{b} = 0,6$$

$$\frac{a}{b} = \frac{6}{10}$$

$$\frac{a}{b} = \frac{3}{5} = \frac{3k}{5k}$$

Luego:

$$720 = 3k + 5k$$

$$k = 90$$

Las partes son:

$$a = 3k \Rightarrow a = 3 \cdot 90 = 270$$

$$b = 5k \Rightarrow a = 5 \cdot 90 = 450$$

Rpta B

Resolución 9

De 5 alternativas la única que cumple con la condición del Problema es la alternativa D.

Veamos:

$$\frac{4}{6} = \frac{6}{9} \Rightarrow 4 \times 6 \times 6 \times 9 = 1\,296$$

Rpta D

Resolución 10

$$\frac{\text{Damas}}{\text{Caballeros}} = \frac{10k}{9k}$$

Del enunciado:

$$\frac{10k-8}{9k-3} = \frac{4}{5}$$

$$50k - 40 = 36k - 12$$

$$14k = 28 \Rightarrow k = 2$$

Luego:

$$\begin{aligned} \text{Número de Damas al inicio} &= 10k \\ &= 20 \end{aligned}$$

Rpta C

Resolución 11

$$\frac{\text{Número de patos}}{\text{Número de pollos}} = \frac{3k}{k}$$

$$\frac{\text{Número de pollos}}{\text{Número de pavos}} = \frac{1}{4} = \frac{1k}{4k}$$

Del enunciado:

$$\begin{aligned} \frac{\text{Número de patos}}{3k} + \frac{\text{Número de pavos}}{4k} &= 28 \\ 3k + 4k &= 28 \\ k &= 4 \end{aligned}$$

Luego:

$$\begin{aligned} \text{Número de pollos} &= 1k \\ &= 4 \end{aligned}$$

Rpta A

Resolución 12

Sea el número pedido = x

$$\frac{2x}{x+2} = \frac{4}{7} \Rightarrow 14x = 4x + 8$$

$$x = 0,8$$

Rpta C

Resolución 13

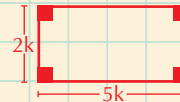
	Pasado	Presente	$\frac{n}{14+n} = 0,75$
Manuel	0	0 + n	$\frac{n}{14+n} = \frac{3}{4}$
Sara	14	14 + n	$\frac{n}{14+n} = \frac{75}{100}$

$$4n = 42 + 3n$$

$$n = 42$$

 $\therefore$ Manuel tiene 42 años

Rpta B

Resolución 14

$$\text{Perímetro} = 70 \text{ cm}$$

$$2(2k + 5k) = 70$$

$$k = 5$$

Luego:

$$\begin{aligned} \text{Área } \square &= 5k \times 2k \\ &= 25 \times 10 \\ &= 250 \text{ cm}^2 \end{aligned}$$

Rpta B

Resolución 15

$$\frac{\text{muchachos}}{\text{chicas}} = \frac{5k}{3k}$$

$$\text{Total de estudiantes} = 8k$$

$$\text{A) } 8k = 32 \Rightarrow k = 4 \quad (\text{Correcto})$$

$$\text{B) } 8k = 36 \Rightarrow k = 4,5 \quad (\text{Incorrecto})$$

$$\text{C) } 8k = 40 \Rightarrow k = 5 \quad (\text{Correcto})$$

$$\text{D) } 8k = 48 \Rightarrow k = 6 \quad (\text{Correcto})$$

$$\text{E) } 8k = 56 \Rightarrow k = 7 \quad (\text{Correcto})$$

Rpta B

Aplica tus aprendizajes 4

Resolución 1

$$32\% \times 1500 = \frac{32}{100} \times 1500 = 480$$

Rpta A

Resolución 2

$$\frac{3}{4}\% \times 1200 = \frac{3}{400} \times 1200 = 9$$

Rpta E

Resolución 3

$$30\% \times 80\% \times 200\% \times 5000$$

$$\frac{30}{100} \times \frac{80}{100} \times \frac{200}{100} \times 5000 = 2400$$

Rpta D

Resolución 4

$$P = \frac{0,24}{0,6} \times 100\%$$

$$P = 40\%$$

Rpta C

Resolución 5

$$P = \frac{\frac{1}{2}}{\frac{5}{6}} \times 100\%$$

$$P = \frac{6}{10} \times 100\%$$

$$P = 60\%$$

Rpta A

Resolución 6

$$P = \frac{\frac{6}{744}}{124} \times 100\%$$

$$P = 600\%$$

Rpta A

Resolución 7

$$P = \frac{\frac{1}{4}}{\frac{5}{8}} \times 100\%$$

$$P = 40\%$$

Rpta D

Resolución 8

$$60\% \cdot N = 180$$

$$N = \frac{180 \times 100}{60}$$

$$N = 300$$

Rpta B

Resolución 9

$$N + 20\%N = 60$$

$$120\%N = 60$$

$$N = \frac{60 \times 100}{120}$$

$$N = 50$$

Rpta D

Resolución 10

$$N - 20\%N = 60$$

$$80\%N = 60$$

$$N = \frac{60 \times 100}{80}$$

$$N = 75$$

Rpta C

Resolución 11

$$= 10\% \cdot \frac{2}{5} \cdot 40\% \cdot 6000$$

$$= \frac{10}{100} \cdot \frac{2}{5} \cdot \frac{40}{100} \cdot 6000$$

$$= 96$$

Rpta E

Resolución 12

$$A = 15\% \cdot 900 \Rightarrow A = 135$$

$$B = 10\% \cdot 300 \Rightarrow B = 30$$

Luego:

$$20\%(A + B) = \frac{20}{100}(165)$$

$$= 33$$

Rpta C

Resolución 13

Sea el número = N

Del enunciado:

$$P \times 2N = \frac{1}{5}N$$

$$P = \frac{1}{10} = \frac{1}{10} \times 100\%$$

$$P = 10\%$$

Rpta C

Resolución 14

$$20\%M = 60\%E \Rightarrow M = 3E$$

$$P \times M = \underline{3E}$$

$$P \times M = M \Rightarrow P = 1$$

$$P = 100\%$$

Rpta D

Resolución 15

$$45\%A = 75\%B$$

$$\boxed{3A = 5B} \Rightarrow A = \frac{5}{3}B$$

$$P \times A = B$$

$$P \times \frac{5}{3}B = B \Rightarrow P = \frac{3}{5}$$

$$P = \frac{3}{5} \times 100\%$$

$$P = 60\%$$

Rpta B

Resolución 16

$$A = 20\%B$$

$$A = \frac{20}{100}B \Rightarrow \boxed{A = \frac{1}{5}B}$$

$$B = 10\%C$$

$$B = \frac{10}{100}C \Rightarrow \boxed{B = \frac{1}{10}C}$$

Luego:

$$P \times C = A$$

$$P \times 10B = \frac{1}{5}B$$

$$P = \frac{1}{50} = \frac{1}{50} \times 100\%$$

$$P = 2\%$$

Rpta A

Resolución 17

Sea el número = N

Del enunciado:

$$P \times 2 \times 60\% \times N = 30\% \cdot 20\% \cdot \frac{2}{5} \cdot N$$

$$P = 2\%$$

Rpta D

Resolución 18

$$40\% \cdot 50\% \cdot A = 30\%B$$

$$2A = 3B \Rightarrow A = \frac{3}{2}B$$

$$P \times (2A + 7B) = (A + B)$$

$$P \times (3B + 7B) = \left(\frac{3}{2}B + B\right)$$

$$P \times 10B = \frac{5}{2}B$$

$$P = \frac{1}{4} = \frac{1}{4} \times 100\%$$

$$P = 25\%$$

Rpta E

Resolución 19

$$S = 150\% \times T$$

$$S = \frac{3}{2}T$$

$$P \times T = (S + T)$$

$$P \times T = \left(\frac{3}{2}T + T\right)$$

$$P \times T = \frac{5}{2}T$$

$$P = \frac{5}{2} \times 100\% = 250\%$$

Rpta A

Resolución 20

Sea el número = N

$$*) 30\% \cdot 20\% \cdot \frac{2}{5} \cdot N = 24\% \cdot 0,01\% \cdot 1\,000$$

$$\frac{30}{100} \cdot \frac{20}{100} \cdot \frac{2}{5} N = \frac{24}{100} \cdot \frac{0,01}{100} \cdot 1\,000$$

$$30 \cdot 8N = 24 \cdot \frac{1}{100} \cdot 1\,000$$

$$N = 1$$

Rpta A

Aplica tus aprendizajes 5

Resolución 1

I) $25\% = \frac{1}{4}$

$$\frac{\cancel{25}}{\cancel{100}} = \frac{1}{4} \quad \dots \text{(Correcto)}$$

II) $40\% = \frac{3}{5}$

$$\frac{\cancel{40}}{\cancel{100}} = \frac{3}{5} \quad \dots \text{(Incorrecto)}$$

III) $62\% = \frac{31}{5}$

$$\frac{\cancel{62}}{\cancel{100}} = \frac{31}{5} \quad \dots \text{(Incorrecto)}$$

IV) $78\% = \frac{39}{50}$

$$\frac{\cancel{78}}{\cancel{100}} = \frac{39}{50} \quad \dots \text{(Correcto)}$$

V) $17\% = \frac{17}{20}$

$$\frac{17}{100} = \frac{17}{20} \quad \dots \text{(Incorrecto)} \quad \therefore \text{I y IV Rpta E}$$

Resolución 2

I) $\frac{4}{5} = 75\%$

$$\frac{4}{5} \times 100\% = 75\% \quad \boxed{80\% = 75\%}$$

... (Incorrecto)

II) $\frac{9}{25} = 36\%$

$$\frac{9}{25} \times 100\% = 36\% \quad \boxed{36\% = 36\%}$$

III) $\frac{13}{4} = 130\%$

$$\frac{13}{4} \times 100\% = 130\% \quad \boxed{325\% = 130\%}$$

... (Incorrecto)

IV) $\frac{21}{5} = 210\%$

$$\frac{21}{5} \times 100\% = 210\% \quad \boxed{420\% = 210\%}$$

... (Incorrecto)

V) $\frac{37}{20} = 375\%$

$$\frac{37}{20} \times 100\% = 345\% \quad \boxed{185\% = 345\%}$$

... (Incorrecto)

$\therefore$ II Rpta B

Resolución 3

a) Pago S/. 20 de una deuda de S/. 80 = 30%

$$\frac{S/.20}{S/.80} = \frac{1}{4} = 25\% = 30\% \quad \dots \text{(Incorrecto)}$$

b) 2 de 10 animales son mamíferos = 20%

$$\frac{2}{10} = \frac{20}{100} = 20\% = 20\% \quad \dots \text{(Correcto)}$$

c) Resuelvo 7 problemas de un total de 10 = 14%

$$\frac{7}{10} = \frac{70}{100} = 70\% = 14\% \quad \dots \text{(Incorrecto)}$$

d) 2 meses al año viajo por trabajo = 25%

$$\frac{2 \text{ meses}}{12 \text{ meses}} = \frac{1}{6} = 16,6\% = 25\% \quad \dots \text{(Incorrecto)}$$

e) 8 alumnos de un total de 20 son excelentes = 45%

$$\frac{8}{20} = \frac{40}{100} = 40\% = 45\% \quad \dots \text{(Incorrecto)}$$

Rpta B

Resolución 4

a	a	a	a	a
a	a	a	a	a

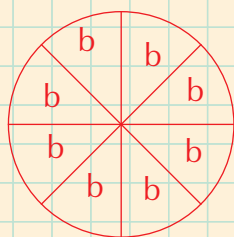
$$P = \frac{\text{Parte pintada}}{\text{área total}} \times 100\%$$

$$P = \frac{6a}{10a} \times 100\%$$

$$P = 60\%$$

Rpta C

Resolución 5



$$P = \frac{\text{Parte pintada}}{\text{área total}} \times 100\%$$

$$P = \frac{6b}{8b} \times 100\% \Rightarrow P = 75\%$$

Rpta D

Resolución 6

C	C	C	C
C	C	C	C
C	C	C	C
C	C	C	C

Hallamos qué porcentaje del área total es la parte sombreada.

$$P = \frac{\text{Parte pintada}}{\text{área total}} \times 100\%$$

$$P = \frac{6C}{16C} \times 100\%$$

$$P = 37,5\%$$

Luego, Hallamos el 40% de 37,5%

$$= \frac{40}{100} \times 37,5\%$$

$$= 15\%$$

Rpta C

Resolución 7

$$P_V = P_C + G$$

$$P_V = S/840 + 30\% S/840$$

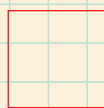
$$P_V = 130\% S/840 = \frac{130}{100} \cdot S/840 = \boxed{S/1\,092}$$

Rpta B

Resolución 8



$$\begin{aligned} L_1 &= 100 \text{ m} \\ A_1 &= (100 \text{ m})^2 \\ A_1 &= 10\,000 \text{ m}^2 \end{aligned}$$



$$\begin{aligned} L_2 &= 130 \text{ m} \\ A_2 &= (130 \text{ m})^2 \\ A_2 &= 16\,900 \text{ m}^2 \end{aligned}$$

$$\frac{A_2}{A_1} = \frac{16\,900 \text{ m}^2}{10\,000 \text{ m}^2} = \frac{169}{100}$$

$$\frac{A_2}{A_1} = 169\% \Rightarrow A_2 = 169\% A_1$$

Rpta. Aumenta en el 69%

Rpta D

Resolución 9

Precio: S/. 100

$$D_1 = 40\% \text{ de } S/.100 = S/.40$$

$$R_1 = S/.60$$

$$D_2 = 50\% \text{ de } S/.60 = \frac{50}{100} \cdot S/.60 = S/.30$$

$$R_2 = S/.60 - S/.30 = S/.30$$

$$\text{Descuento único} = S/.100 - S/.30 = S/.70$$

$$\text{y } S/.70 \text{ de } S/.100 \text{ es el } \boxed{70\%}$$

Rpta A

Resolución 10

$$N - x\%N = \frac{60}{100} \cdot \frac{25}{100} \cdot \frac{80}{100} \cdot \frac{50}{100} \cdot \frac{10}{3} N$$

$$N - x\%N = \frac{40}{200} N$$

$$1 - x\% = \frac{1}{5}$$

$$1 - \frac{1}{5} = x\% \Rightarrow \frac{4}{5} = x\%$$

$$0,80\% = x\% \Rightarrow 80\% = x\%$$

Rpta C

Resolución 11

Total : 1 500 alumnos

$$H = 70\% \text{ de } 1\,500 = \frac{70}{100} \cdot 1\,500 = 1\,050$$

$$M = 30\% \text{ de } 1\,500 = \frac{30}{100} \cdot 1\,500 = 450$$

Finalmente:

$$\# \text{ Mujeres} = 140\% \text{ de } 450 = \frac{140}{100} \cdot 450 = 630$$

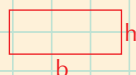
$$\# \text{ Hombres} = 110\% \text{ de } 1\,050 = \frac{110}{100} \cdot 1\,050 = 1\,155$$

$$\text{Total final de alumnos} = 630 + 1\,155 = 1\,785$$

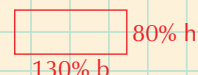
$$\% \text{ aumento} = \frac{1\,785 - 1\,500}{1\,500} = 0,19 = \boxed{19\%}$$

Rpta D

Resolución 12



$$A_1 = b \cdot h$$

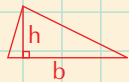


$$\begin{aligned} A_2 &= 130\%b \cdot 80\%h \\ &= \frac{130}{100}b \cdot \frac{80}{100}h \\ A_2 &= \frac{104}{100} \underbrace{b \cdot h} \\ A_2 &= 104\% A_1 \end{aligned}$$

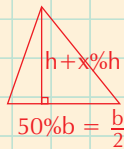
Rpta. El área del rectángulo aumenta en 4%

Rpta D

Resolución 13



$$A_1 = b \cdot h$$



$$A_2 = \frac{\frac{b}{2} \cdot (h + x\%h)}{2}$$

$$\Rightarrow \frac{b \cdot h}{2} = \frac{\frac{b}{2} \cdot (h + x\%h)}{2}$$

$$h = \frac{1}{2} (h + x\%h)$$

$$h = \frac{1}{2} h (1 + x\%)$$

$$2 = (1 + x\%)$$

$$x\% = 1$$

$$\boxed{x\% = 100\%}$$

Rpta. Debe aumentar en 100%

Rpta B

Resolución 14

$$Pc + G = Pv$$

$$Pc + 20\% Pc = S/.720$$

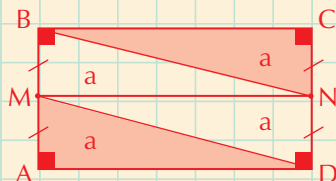
$$120\% Pc = S/.720$$

$$\frac{120}{100} Pc = S/.720$$

$$Pc = \frac{S/.720 \cdot 100}{120} \quad \boxed{Pc = S/.600}$$

Rpta D

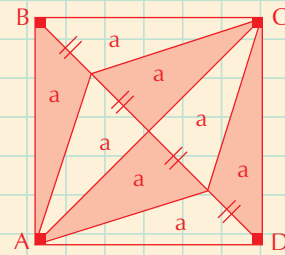
Resolución 15



$$x = \frac{\text{Parte pintada}}{\text{Área del rectángulo}} = \frac{2a}{4a} = \frac{1}{2} = \boxed{50\%}$$

Rpta D

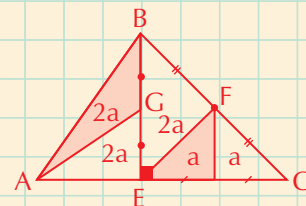
Resolución 16



$$x = \frac{\text{Parte pintada}}{\text{Área del cuadrado}} = \frac{4a}{8a} = \frac{1}{2} = \boxed{50\%}$$

Rpta C

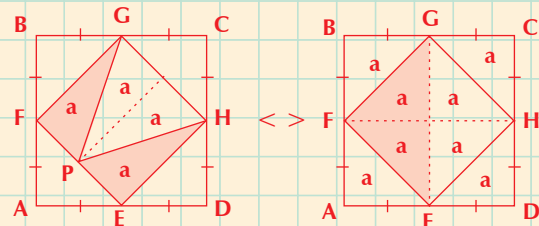
Resolución 17



$$x = \frac{\text{Parte pintada}}{\text{Área del triángulo}} = \frac{3a}{8a} = 0,375 = 37,5\%$$

Rpta D

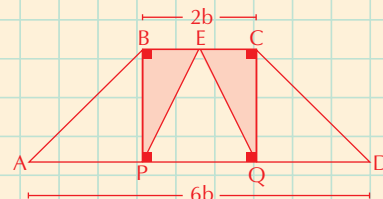
Resolución 18



$$x = \frac{\text{Parte pintada}}{\text{Área del cuadrado}} = \frac{2a}{8a} = \frac{1}{4} = 25\%$$

Rpta C

Resolución 19

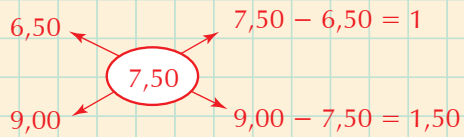


$$\begin{aligned} \text{Área pintada} &= \frac{1}{2} \text{Área } \square PBCQ \\ &= \frac{1}{2} \cdot 2b \cdot b \\ &= b \cdot b \end{aligned}$$

$$\begin{aligned}\text{Área total} &= \left(\frac{6b + 2b}{2}\right) BP \\ &= 4b \cdot BP\end{aligned}$$

$$\frac{\text{Parte pintada}}{\text{Área total}} = \frac{b \cdot BP}{4b \cdot BP} = \frac{1}{4} = 25\%$$

Rpta C

Resolución 20

$$\begin{aligned}\text{Además: } 1k + 1,5k &= 45 \text{ kg} \\ k &= 18 \text{ kg}\end{aligned}$$

$$\begin{aligned}\text{Luego } C_1 &= 1(18 \text{ kg}) = 18 \text{ kg} \\ C_2 &= 1,5(18 \text{ kg}) = 27 \text{ kg}\end{aligned}$$

Los kilogramos son 18 y 27

Rpta D

UNIDAD 3

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 1

Del enunciado:

$$Q = K \cdot Z \dots(I)$$

Cuando $Q = 18$; $Z = 6$

$$\text{De (I)} \quad 18 = k \cdot 6 \Rightarrow \boxed{k = 3}$$

Cuando $Z = 14$; hallar "Q"

De (I)

$$Q = 3 \cdot 14$$

$$Q = 42$$

Rpta C

Resolución 2

Del enunciado:

$$A^2 = K \cdot B \dots(I)$$

Cuando: $A = 2$; $B = 16$

$$\text{De (I)} \quad 2^2 = k \cdot 16 \Rightarrow \boxed{k = \frac{1}{4}}$$

Cuando $B = 12$; hallar "A"

De (I)

$$A^2 = \frac{1}{4} \cdot 12$$

$$A = \sqrt{3}$$

Rpta A

Resolución 3

$$110 \begin{cases} \frac{1}{3}k \\ \frac{2}{3}k \\ \frac{5}{6}k \end{cases} \dots (I)$$

Luego

$$\frac{1}{3}k + \frac{2}{3}k + \frac{5}{6}k = 110$$

$$\frac{11}{6}k = 110 \Rightarrow \boxed{k = 60}$$

De (I)

$$\frac{1}{3}k = \frac{1}{3} \cdot 60 = 20 (\text{menor})$$

$$\frac{2}{3}k = \frac{2}{3} \cdot 60 = 40$$

$$\frac{5}{6}k = \frac{5}{6} \cdot 60 = 50 (\text{mayor})$$

RptaCB

Resolución 4

$$S/. 1350 \begin{cases} \frac{1}{6}k \Rightarrow 6k \\ \frac{1}{7}k \Rightarrow 7k \\ \frac{1}{4}k \Rightarrow 4k \dots (\text{menor}) \\ \frac{1}{8}k \Rightarrow 8k \dots (\text{mayor}) \end{cases}$$

Luego:

$$1350 = 6k + 7k + 4k + 8k$$

$$1350 = 25k$$

$$\boxed{k = 54}$$

$$\therefore \text{Parte mayor} = 8 \cdot 54 = 432$$

Rpta C

Resolución 5

Del enunciado tenemos

$$A = K \cdot \frac{B}{\sqrt{C}} \dots(I)$$

Además:

$$A \Rightarrow \frac{k \cdot 24}{\sqrt{36}}$$

$$30 \Rightarrow k \cdot \frac{8}{\sqrt{25}} \Rightarrow k = \frac{75}{4}$$

Reemplazamos (ii) en (i)

$$A = \frac{\frac{75}{4} \cdot 24}{6} = 75$$

$$\therefore \text{Suma de cifras de "A" es 12}$$

Rpta C

Resolución 6

$$12240 \begin{cases} \frac{2}{3}k \\ \frac{1}{5}k \\ \frac{5}{6}k \end{cases} \dots (I)$$

Luego:

$$12240 = \frac{2}{3}k + \frac{1}{5}k + \frac{5}{6}k$$

$$12240 = \frac{20k + 6k + 25k}{30}$$

$$\boxed{k = 7200}$$

$$\text{De (I): } \frac{2}{3}k = \frac{2}{3} \cdot 7200 = 4800$$

$$\frac{1}{5}k = \frac{1}{5} \cdot 7200 = 1440$$

$$\frac{5}{6}k = \frac{5}{6} \cdot 7200 = 6000$$

$$\therefore \text{El menor es 1440}$$

Rpta B

Resolución 7

$$200 \begin{cases} \sqrt{8}k = 2\sqrt{2}k \\ \sqrt{18}k = 3\sqrt{2}k \quad \dots (I) \\ \sqrt{50}k = 5\sqrt{2}k \end{cases}$$

Pero

$$\begin{aligned} 2\sqrt{2}k + 3\sqrt{2}k + 5\sqrt{2}k &= 200 \\ 10\sqrt{2}k &= 200 \\ \sqrt{2}k &= 20 \quad \dots (II) \end{aligned}$$

Reemplazando (II) en (I):

$$2\sqrt{2}k = 2 \cdot 20 = 40$$

$$3\sqrt{2}k = 3 \cdot 20 = 60$$

$$5\sqrt{2}k = 5 \cdot 20 = 100$$

$\therefore$ La mayor parte es 100

Rpta C

Resolución 8

$$\text{Sean las 3 partes} \begin{cases} a \\ b \\ c \end{cases} \quad \dots (I)$$

Donde $a + b + c = 2\,560 \quad \dots (I)$

$$\text{Además} \begin{cases} a^2 = 125k \Rightarrow a = 5\sqrt{5k} \\ b^2 = 245k \Rightarrow b = 7\sqrt{5k} \\ c^2 = 80k \Rightarrow c = 4\sqrt{5k} \end{cases}$$

De (I)

$$5\sqrt{5k} + 7\sqrt{5k} + 4\sqrt{5k} = 2\,560$$

$$16\sqrt{5k} = 2\,560$$

$$\boxed{\sqrt{5k} = 160}$$

Luego:

$$a = 5\sqrt{5k} = 5 \cdot 160 = 800$$

$$b = 7\sqrt{5k} = 7 \cdot 160 = 1\,120$$

$$\therefore c = 4\sqrt{5k} = 4 \cdot 160 = 640$$

El menor es 640

Rpta C

Resolución 9

$$6\,600 \begin{cases} \sqrt{2}k \\ \sqrt{8}k = 2\sqrt{2}k \\ \sqrt{18}k = 3\sqrt{2}k \\ \sqrt{50}k = 5\sqrt{2}k \end{cases}$$

$$\begin{aligned} \text{Pero } \sqrt{2}k + 2\sqrt{2}k + 3\sqrt{2}k + 5\sqrt{2}k &= 6\,600 \\ 11\sqrt{2}k &= 6\,600 \\ \sqrt{2}k &= 600 \end{aligned}$$

Luego

$$\sqrt{2}k = 600$$

$$2\sqrt{2}k = 2 \cdot 600 = 1\,200$$

$$3\sqrt{2}k = 3 \cdot 600 = 1\,800$$

$$5\sqrt{2}k = 5 \cdot 600 = 3\,000$$

$\therefore$ La parte mayor es 3 000

Rpta A

Resolución 10

$$5\,700 \begin{cases} \sqrt{8} \Rightarrow \frac{1}{\sqrt{8}}k = \frac{1}{2\sqrt{2}}k \\ \sqrt{50} \Rightarrow \frac{1}{\sqrt{50}}k = \frac{1}{5\sqrt{2}}k \\ \sqrt{32} \Rightarrow \frac{1}{\sqrt{32}}k = \frac{1}{4\sqrt{2}}k \quad \dots (I) \end{cases}$$

luego:

$$5\,700 = \frac{1}{2\sqrt{2}}k + \frac{1}{5\sqrt{2}}k + \frac{1}{4\sqrt{2}}k$$

$$5\,700 = \frac{10k + 4k + 5k}{20\sqrt{2}}$$

$$6\,000 = \frac{k}{\sqrt{2}}$$

Reemplazando, obtenemos:

$$\frac{1}{2\sqrt{2}}k = \frac{1}{2} \cdot 6\,000 = 3\,000$$

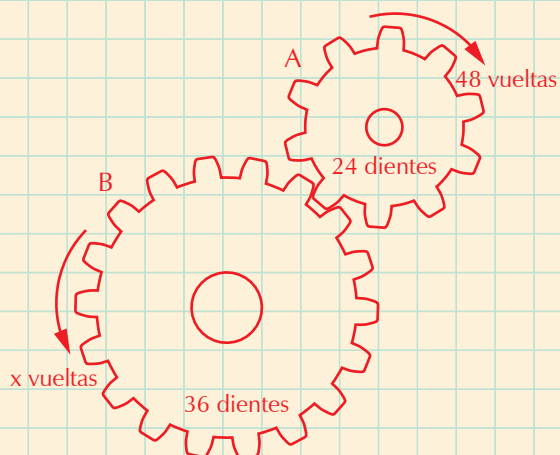
$$\frac{1}{5\sqrt{2}}k = \frac{1}{5} \cdot 6\,000 = 1\,200$$

$$\frac{1}{4\sqrt{2}}k = \frac{1}{4} \cdot 6\,000 = 1\,500$$

$\therefore$ La parte menor es 1 200

Rpta B

Resolución 11



$$\frac{x}{24} = \frac{48}{36}$$

$$x = 32$$

Rpta D

Resolución 12

$$A = \frac{k \cdot \sqrt{B}}{\sqrt[3]{C}} \dots (I)$$

Cuando $A = 14$; $B = 64$ y $C = B = 64$

$$\text{De (I)} \quad 14 = \frac{K \cdot \sqrt{64}}{\sqrt[3]{64}} \Rightarrow 14 = \frac{K(8)}{4}$$

$$\Rightarrow K = 7$$

Hallar "A", cuando $\begin{cases} B = 4 \\ C = 2B = 2(4) = 8 \end{cases}$

De (I)

$$A = \frac{K \cdot \sqrt{4}}{\sqrt[3]{8}} = \frac{7(2)}{2}$$

$$A = 7$$

Rpta B

Resolución 13

$$A = k \cdot B^2 \dots (I)$$

Cuando $A = 45$; $B = 3$

$$\text{De (I)} \quad 45 = K \cdot 3^2 \Rightarrow K = 5$$

Cuando: $A = 320$; $B = m$

$$\text{De (I)} \quad 320 = 5 \cdot m^2$$

$$m = 8$$

Cuando $A = n$; $B = 10$

$$\text{De (I)} \quad n = k \cdot 10^2 \Rightarrow n = 5 \cdot 10^2$$

$$n = 500$$

Luego

$$m + n = 8 + 500 = 508$$

Rpta C

Resolución 14

Tenemos

Recorrido por carga = $k \dots (I)$

$$\text{De (I)} \quad 40 \cdot 2 = k \quad / \quad k = 80$$

$$\text{De (I)} \quad x \cdot 5 = 80$$

$$x = 16$$

Rpta A

Resolución 15

$$\text{Carlos tiene 2 vocales} \Rightarrow \frac{k}{2}$$

$$\text{Mario tiene 3 vocales} \Rightarrow \frac{k}{3}$$

$$\text{Timotea tiene 4 vocales} \Rightarrow \frac{k}{4}$$

Del enunciado tenemos

$$\frac{k}{2} + \frac{k}{3} + \frac{k}{4} = 78$$

$$\frac{13}{12}k = 78 \Rightarrow k = 72$$

Luego

$$\text{Timotea recibe: } \frac{k}{4} = \frac{72}{4} = 18$$

Rpta B

Aplica tus aprendizajes 2

Resolución 1

- El número de objetos y precios
(Es directamente proporcional)
- Tiempo trabajado y el salario
(Es directamente proporcional)
- Velocidad y tiempo
(Es inversamente proporcional)
Porque a mayor velocidad que realiza un móvil menor será el tiempo empleado
- Talla de una persona y su peso
(No hay relación entre magnitudes)
- Distancia recorrida y tiempo empleado
(es directamente proporcional)

Rpta C

Resolución 2

$$\frac{a}{1} = \frac{4}{2} = \frac{6}{b}$$

① ②

De ① : $\frac{a}{1} = \frac{4}{2} \Rightarrow a = 2$

De ② : $\frac{4}{2} = \frac{6}{b} \Rightarrow b = 3$

Luego $a + b = 5$

Rpta A

Resolución 3

$$\frac{8}{y} = \frac{x}{24} = \frac{20}{30}$$

①

De ① : $\frac{x}{24} = \frac{20}{30} \Rightarrow x = 16$

De ② : $\frac{8}{y} = \frac{20}{30} \Rightarrow y = 12$

Luego $x + y = 16 + 12 = 28$

Rpta A

Resolución 4

$$x \cdot 10 = 8 \cdot 25 = 5y$$

① ②

De ① : $x \cdot 10 = 8 \cdot 25 \Rightarrow x = 20$

De ② : $8 \cdot 25 = 5y \Rightarrow y = 40$

Luego $x + y = 60$

Rpta C

Resolución 5

$$\frac{(x-1) \cdot 45}{1} = \frac{x \cdot 36}{2} = (x+1) \cdot y$$

De ① : $(x-1) \cdot 45 = x \cdot 36$
 $5x - 5 = 4x \Rightarrow x = 5$

De ② : $x \cdot 36 = (x+1) \cdot y$
 $5 \cdot 36 = 6 \cdot y \Rightarrow y = 30$

Luego $2x + 3y = 10 + 90 = 100$

Rpta A

Resolución 6

*) $\frac{4}{10} = \frac{6}{a} \Rightarrow a = 15$

**) $6a = 10b$
 $6 \cdot 15 = 10b \Rightarrow b = 9$

Luego $a - b = 15 - 9 = 6$

Rpta D

Resolución 7

$$\frac{2}{6} = \frac{n}{18} = \frac{8}{m}$$

①

De ① : $\frac{2}{6} = \frac{n}{18} \Rightarrow n = 6$

De ② : $\frac{2}{6} = \frac{8}{m} \Rightarrow m = 24$

Luego $\frac{m+n}{2} = \frac{24+6}{2} = 15$

Rpta B

Resolución 8

$$2a = \frac{6 \cdot 8}{1} = 12b$$

① ②

De ① : $2a = 6 \cdot 8 \Rightarrow a = 24$

De ② : $6 \cdot 8 = 12b \Rightarrow b = 4$

Luego: $\frac{a}{b} = \frac{24}{4} = 6$

Rpta E

Resolución 9

*) $\frac{a}{1,6} = \frac{15}{8} \Rightarrow a = 3$

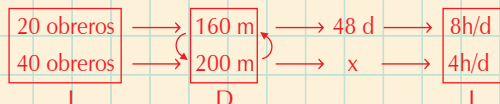
**) $15 \cdot 8 = b \cdot 6 \Rightarrow b = 20$

Luego $a + b = 3 + 20 = 23$

Rpta C

Aplica tus aprendizajes 3

Resolución 1



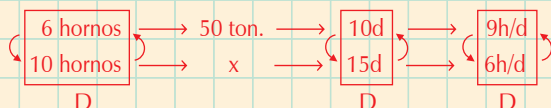
$$x = \frac{20 \cdot 200 \cdot 48 \cdot 8}{40 \cdot 160 \cdot 4}$$

$$x = 60 \text{ d}$$

Rpta. Podrán hacerlo en 60 días.

Rpta A

Resolución 2



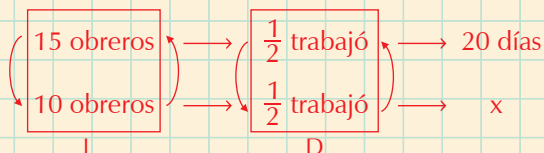
$$x = \frac{10 \cdot 50 \text{ ton} \cdot 15 \cdot 6}{6 \cdot 10 \cdot 9}$$

$$x = 83,3 \text{ ton.}$$

Rpta. Consumirán 83,3 toneladas.

Rpta A

Resolución 3



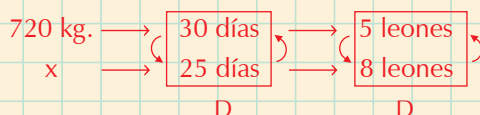
$$x = \frac{15 \cdot \frac{1}{2} \cdot 20 \text{ días}}{10 \cdot \frac{1}{2}}$$

$$x = 30 \text{ días.}$$

Rpta. Tardarán 30 días.

Rpta D

Resolución 4



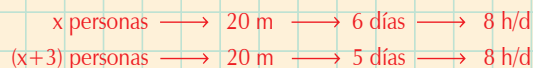
$$x = \frac{720 \text{ kg} \cdot 25 \cdot 8}{30 \cdot 5}$$

$$x = 960 \text{ kg}$$

Rpta. Se necesitarán 960 kg.

Rpta A

Resolución 5



$$x \cdot 6 = (x + 3) \cdot 5$$

$$x = 15 \text{ personas}$$

$$15 \text{ personas} \rightarrow 6 \text{ días}$$

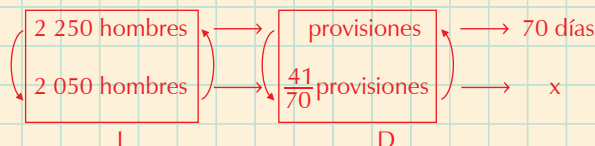
$$1 \text{ personas} \rightarrow y$$

$$x = \frac{15 \text{ personas} \cdot 6 \text{ días}}{1 \text{ persona}} = 90 \text{ días}$$

Rpta. Podrá cavarla en 90 días.

Rpta E

Resolución 6



$$x = \frac{2\,250 \cdot \frac{41}{70} \cdot 70 \text{ días}}{2\,050 \cdot 1}$$

$$x = 45 \text{ días.}$$

Rpta. Durarán 45 días.

Rpta B

Resolución 7

$$5 \text{ personas} \rightarrow 280 \text{ m}$$

$$13 \text{ personas} \rightarrow x$$

$$x = \frac{13 \cdot 280 \text{ m}}{5} \Rightarrow x = 728 \text{ m}$$

Rpta. Habrá realizado 728 m.

Rpta D

Resolución 8

$$\frac{\text{Ayudante}}{\text{Albañil}} = \frac{1}{3}$$

$$\Rightarrow \text{Albañil} = 3 \text{ ayudantes}$$

$$2 \text{ albañiles y } 3 \text{ ayudantes} = 9 \text{ ayudantes}$$

$$3 \text{ albañiles y } 2 \text{ ayudantes} = 11 \text{ ayudantes}$$

$$9 \text{ ayudantes} \rightarrow 22 \text{ días}$$

$$11 \text{ ayudantes} \rightarrow x$$

$$x = \frac{9 \cdot 22 \text{ días}}{11}$$

$$x = 18 \text{ días}$$

Rpta. Realizarán la obra en 18 días.

Rpta D

Resolución 9

$$\begin{aligned} \frac{3}{8} \text{ obra} &\longrightarrow 15 \text{ días} \\ \frac{5}{8} \text{ obra} &\longrightarrow x \\ x &= \frac{\frac{5}{8} \cdot 15 \text{ días}}{\frac{3}{8}} \\ x &= 25 \text{ días} \end{aligned}$$

Rpta. Se terminará en 25 días.

Rpta B

Resolución 10

$$\begin{aligned} 3 \text{ raciones diarias} &\longrightarrow 60 \text{ días} \\ 2 \text{ raciones diarias} &\longrightarrow x \\ x &= \frac{3 \cdot 60 \text{ días}}{2} \\ x &= 90 \text{ días} \end{aligned}$$

Rpta. Se podrá alimentar 30 días más.

Rpta A

Resolución 11

$$\begin{aligned} \begin{array}{|c|} \hline 12 \text{ agricultores} \\ 8 \text{ agricultores} \\ \hline \end{array} &\begin{array}{|c|} \hline 10 \text{ días} \\ 15 \text{ días} \\ \hline \end{array} \begin{array}{|c|} \hline 8 \text{ h/d} \\ 9 \text{ h/d} \\ \hline \end{array} \longrightarrow 240 \text{ plantones} \\ &\begin{array}{|c|} \hline D \\ D \\ D \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array} \\ x &= \frac{8 \cdot 15 \cdot 9 \cdot 240 \text{ plantones}}{12 \cdot 10 \cdot 8} \\ x &= 270 \text{ plantones} \end{aligned}$$

Rpta. Podrán sembrar 270 plantones.

Rpta B

Resolución 12

$$\begin{aligned} \begin{array}{|c|} \hline 4 \text{ máquinas} \\ 3 \text{ máquinas} \\ \hline \end{array} &\begin{array}{|c|} \hline 70\% \\ 80\% \\ \hline \end{array} \begin{array}{|c|} \hline 2\,000 \text{ artículos} \\ x \\ \hline \end{array} \begin{array}{|c|} \hline 8 \text{ días} \\ 14 \text{ días} \\ \hline \end{array} \\ &\begin{array}{|c|} \hline D \\ D \\ D \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array} \\ x &= \frac{3 \cdot 80\% \cdot 2\,000 \text{ artículos} \cdot 14}{4 \cdot 70\% \cdot 8} \\ x &= 3\,000 \text{ artículos} \end{aligned}$$

Rpta. Producirá 3 000 artículos.

Rpta D

Resolución 13

$$\begin{aligned} 15 \text{ obreros} &\longrightarrow \begin{array}{|c|} \hline 12 \text{ jeans} \\ 60 \text{ jeans} \\ \hline \end{array} \begin{array}{|c|} \hline 15 \text{ días} \\ 25 \text{ días} \\ \hline \end{array} \\ x &\longrightarrow \begin{array}{|c|} \hline D \\ I \\ \hline \end{array} \\ x &= \frac{15 \text{ obreros} \cdot 60 \cdot 15}{12 \cdot 25} \\ x &= 45 \text{ obreros} \end{aligned}$$

Rpta.

Deberán contratar $45 - 15 = 30$ obreros de igual rendimiento que los anteriores; pero si el rendimiento o habilidad es el doble, solo deberá contratar a 15 obreros.

Rpta C

Resolución 14

Inicialmente:

$$30 \text{ d} \longrightarrow 15 \text{ obreros} \longrightarrow 10 \text{ h/d} \longrightarrow \text{obra}$$

Lo que ocurrió es:

$$\begin{aligned} \begin{array}{|c|} \hline 8 \text{ d} \\ 10 \text{ d} \\ \hline \end{array} &\begin{array}{|c|} \hline 15 \text{ obreros} \\ x \\ \hline \end{array} \begin{array}{|c|} \hline 10 \text{ h/d} \\ 11 \text{ h/d} \\ \hline \end{array} \begin{array}{|c|} \hline \frac{8}{30} \text{ obra} \\ \frac{22}{30} \text{ obra} \\ \hline \end{array} \\ &\begin{array}{|c|} \hline I \\ I \\ D \\ \hline \end{array} \end{aligned}$$

$$\begin{aligned} x &= \frac{8 \cdot 15 \text{ obreros} \cdot 10 \cdot \frac{22}{30}}{10 \cdot 11 \cdot \frac{8}{30}} \\ x &= 30 \text{ obreros} \end{aligned}$$

Rpta. Debieron emplearse $30 - 15 = 15$ obreros más.

Rpta D

Aplica tus aprendizajes 4

Resolución 1

$$A = \{-1; 3; 4; 7\}$$

$$B = \{-2; 0; 5\} \quad R: B \times A$$

$$A) f_1 = \{(-2; -1), (0; 3), (5; 4)\} \dots B \times A$$

$$B) f_3 = \{(-2; 3), (5; 7)\} \dots B \times A$$

$$C) f_3 = \{(0; -1), (5; 3), (-2; 3)\} \dots B \times A$$

$$D) f_4 = \{(3; -2), (4; 0), (7; 5)\} \dots A \times B \quad \text{Rpta. D}$$

Resolución 2

$$* f(x) = 3x^2 - 4x + 5$$

$$f(2) = 3(2)^2 - 4(2) + 5 \Rightarrow f(2) = 9$$

$$* g(x) = 5 - 2x^2$$

$$g(-3) = 5 - 2(-3)^2 \Rightarrow g(-3) = -13$$

$$\therefore f(2) + g(-3) = -4 \quad \text{Rpta. D}$$

Resolución 3

$$y = \frac{2}{3}x^2$$

$$A) (0; 0) \Rightarrow x = 0 \Rightarrow y = 0 \dots (V)$$

$$B) (3; 6) \Rightarrow x = 3 \Rightarrow y = 6 \dots (V)$$

$$C) (-6; 24) \Rightarrow x = -6 \Rightarrow y = 24 \dots (V)$$

$$D) (\sqrt{3}; 2) \Rightarrow x = \sqrt{3} \Rightarrow y = 2 \dots (V)$$

$$E) (2; 9) \Rightarrow x = 2 \Rightarrow y = \frac{8}{3} \dots (F) \quad \text{Rpta. E}$$

Resolución 4

$$R_1 = \{(a; a), (a; b), (b; b), (c; c)\}$$

$$R_2 = \{(a; a), (a; b), (a; c), (b; a), (b; b)\}$$

$$R_3 = \{(a; a), (b; b), (b; c), (c; b), (c; c)\}$$

$$\therefore \text{Son reflexivas } R_1 \text{ y } R_3 \quad \text{Rpta. D}$$

Resolución 5

$$A = \{2; 3; 4\}$$

Es reflexiva

$$2 \in A \rightarrow 2 R 2 \rightarrow (2; 2) \in R$$

$$3 \in A \rightarrow 3 R 3 \rightarrow (3; 3)$$

$$4 \in A \rightarrow 4 R 4 \rightarrow (4; 4) \in R$$

$$\therefore \{(2; 3), (2; 2), (3; 3), (4; 4), (4; 3)\} \quad \text{Rpta. B}$$

Resolución 6

$$A = \{x \in \mathbb{N} / 1 < x < 10\}$$

$$A = \{2; 3; 4; 5; 6; 7; 8; 9\}$$

$$R = \{(a; b) / a = 2b\}$$

$$R = \{(4; 2), (6; 3), (8; 4)\}$$

$$\therefore \text{Su rango es } \{2; 3; 4\} \quad \text{Rpta. D}$$

Resolución 7

$$R = \{(1; 3), (2; 6), (3; 9)\}$$

$$R = \{(a; b) / \overline{ab} = a + 4b\} \quad \text{Rpta. B}$$

Resolución 8

$$M = \{-2; -1; 0; 1\}$$

$$N = \{13; 16\}$$

$$\text{No pertenece a } M \times N \text{ el par ordenado } (-2; 5) \quad \text{Rpta. B}$$

Resolución 9

$$J = \{10 - x^2 / -6 < x \leq 2 ; x \in \mathbb{Z}\}$$

$$J = \{-15; -6; 1; 6; 9; 10\}$$

$$R = \{(x; y) \in J \times \mathbb{Z} / y = 30 - 3x\}$$

$$R = \{(-15; 75), (-6; 48), (1; 27), (6; 12), (9; 3), (10; 0)\}$$

$$\text{Rango}(R) = \{75; 48; 27; 12; 3; 0\} \quad \text{Rpta. A}$$

Resolución 10

$$f(x) = 3x^2 - 1$$

$$f(5) = 3(5)^2 - 1 \Rightarrow f(5) = 74$$

$$f(2) = 3(2)^2 - 1 \Rightarrow f(2) = 11$$

$$f(\sqrt{6}) = 3(\sqrt{6})^2 - 1 \Rightarrow f(\sqrt{6}) = 17$$

$$\therefore \frac{f(5) + f(2)}{f(\sqrt{6})} = 5 \quad \text{Rpta. A}$$

Resolución 11

$$-2 < x < 4$$

$$-1 < \frac{1}{2}x < 2$$

$$-4 < \frac{1}{2}x - 3 < -1$$

$$f(x) \in < -4; -1 > \quad \text{Rpta. D}$$

Resolución 12

$$A = \{4; 8; 7; 9\}$$

$$R = \{(4;4), (4;8), (4;7), (8;8), (8;4), (7;7), (7;4), (9;9)\}$$

Es reflexiva

$$4 \in A \rightarrow (4;4) \in R$$

$$8 \in A \rightarrow (8;8) \in R$$

$$7 \in A \rightarrow (7;7) \in R$$

$$9 \in A \rightarrow (9;9) \in R$$

Es simétrica

$$4 R 7 \rightarrow 7 R 4$$

$$4 R 8 \rightarrow 8 R 4$$

Rpta. C

Aplica tus aprendizajes 5

Resolución 1

$$A = \{-2; 3\}$$

$$B = \{1; 2\}$$

$$\therefore A \times B = \{(-2;1); (-2;2); (3;1); (3;2)\}$$

Rpta. D

Resolución 2

$$A = \{3; 4; 5; 6\}$$

$$B = \{6; 7\}$$

$$\therefore (A \cap B) \times B$$

$$\{6\} \times \{6; 7\}$$

$$\{(6;6); (6;7)\}$$

Rpta. E

Resolución 3

$$A = \{2; 3; 4\}$$

$$B = \{5; 6\}$$

$$R: A \times B$$

$$A) \{2;5\} \dots(V)$$

$$B) \{3;6\} \dots(V)$$

$$C) \{(2;6), (1;5)\} \dots(F)$$

$$D) \{(4;5), (4;6)\} \dots(V)$$

$$E) \{(2;5), (3;5), (3;6)\} \dots(V)$$

Rpta.C

Resolución 4

$$R = \{(Lima; Perú), (Perú, x), (Caracas; y), (Santiago; z), (Chile, Santiago)\}$$

Es simétrica:

$$Lima R Perú \Rightarrow Perú R Lima$$

$$Santiago R Chile \Rightarrow Chile R Santiago$$

$$Caracas R Caracas$$

$$A = \{x; y; z\}$$

$$A = \{Lima; Caracas; Chile\}$$

Rpta. A

Resolución 5

$$M = \{1; 2; 3\}$$

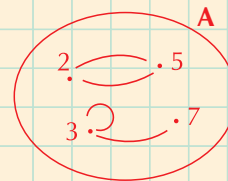
$$\text{Es simétrica: } \{(1;2), (2;1), (3;3)\}$$

Rpta. D

Resolución 6

$$R = \{(2;5), (3;7), (3;3), (5;2)\}$$

$$A = \{2; 3; 5; 7\}$$



Rpta. C

Resolución 7

$$A = \{4; 5; 8; 9\}$$

$$R = \{(x;y) / x + y \text{ es número par}\}$$

$$R = \{(4;4), (5;5), (8;8), (9;9), (4;8), (5;9), (8;4), (9;5)\}$$

$$\therefore n(R) = 8$$

Rpta. B

Resolución 8

$$2^{2^2} = 2^4 = 16$$

Rpta. E

Resolución 9

I. Si R es una relación de equivalencia, entonces R es simétrica(V)

II. Dado $A = \{2, 3, 4\}$, en el se pueden definir 512 relaciones diferentes ...(V)

III. Dado $B = \{a, b, c, d\}$ se define $R \subset B \times B$ tal que $R = \{a;c\}, (b;d), (c;a), (a;a)$ entonces es transitiva ...(F)

$$\therefore \vee \vee F$$

Rpta.C

Resolución 10

$$A = \{1; 2; 3; 4\}$$

$$B = \{2; 4; 6; 8\}$$

$$C = \{2; 3; 7\}$$

$$A) (A - B) \times C = \{1; 3\} \times \{2; 3; 7\}$$

$$n((A - B) \times C) = 6$$

$$B) (A \cap B) \times C = \{2; 4\} \times \{2; 3; 7\}$$

$$n[(A \cap B) \times C] = 6$$

$$C) A \times (B - C) = \{1; 2; 3; 4\} \times \{4; 6; 8\}$$

$$n[A \times (B - C)] = 12$$

$$D) A \times (B \cup C) = \{1; 2; 3; 4\} \times \{2; 3; 4; 6; 7; 8\}$$

$$n[A \times (B \cup C)] = 24$$

$$E) A \times (B \cap C) = \{1; 2; 3; 4\} \times \{2\}$$

$$n[A \times (B \cap C)] = 4$$

Rpta. D

Resolución 11

$$S = \{6 - 3x / 5 \leq x < 7\}, x \in \mathbb{Z}$$

$$S = \{-9; -12\}$$

$$S^2 = \{(-9; -9), (-9; -12), (-12; -9), (-12; -12)\}$$

Rpta. B

Resolución 12

$$A = \{x \in \mathbb{N} / 1 \leq x \leq 7; x \text{ es impar}\}$$

$$A = \{1; 3; 5; 7\}$$

$$B = \{x \in \mathbb{Z} / -1 < x < 3\}$$

$$B = \{0; 1; 2\}$$

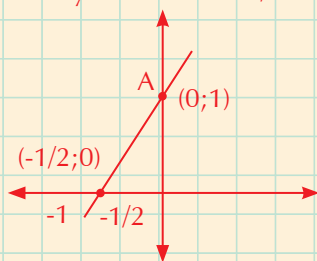
$$\therefore \text{No es función de } A \times B: \{(1; 1), (5; 2), (9; 0)\}$$

Rpta. C

Resolución 13

$$y = 2x + 1 \Rightarrow x = 0 \rightarrow y = 1$$

$$y = 0 \rightarrow x = -1/2$$



Rpta. B

Resolución 14

$$M = f(0) + f(1) - f(2)$$

$$M = 3 + 2 - 3 = 2$$

Rpta. DB

Aplica tus aprendizajes 6

Resolución 1

$$(a + 3; 7) = (8; b)$$

$$a + 3 = 8 \wedge b = 7$$

$$a = 5$$

$$\Rightarrow a + b = 12$$

Rpta. A

Resolución 2

$$G = \{x \in \mathbb{Z} / -6 < x < 2\}$$

$$G = \{-5; -4; -3; -2; -1; 0; 1\}$$

$$H = \{x \in \mathbb{Z} / -5 < x < 0\}$$

$$H = \{-4; -3; -2; -1\}$$

$$\therefore n(G \times H) = n(G) \times n(H) = 7 \times 4$$

$$n(G \times H) = 28$$

Rpta. C

Resolución 3

$$A = \{x \in \mathbb{N} / 7 < x < 15\}$$

$$A = \{8; 9; 10; 11; 12; 13; 14\}$$

$$B = \{x \in \mathbb{N} / 2 < x < 7\}$$

$$B = \{3; 4; 5; 6\}$$

$$\therefore R = \{(x, y) \in A \times B / y = x/2\}$$

$$R = \{(8; 4), (10; 5), (12; 6)\}$$

Rpta. C

Resolución 4

$$S = \{10; 12; 14; 16; 18\}$$

$$T = \{3; 5; 7; 9\}$$

$$R = \{(x, y) \in S \times T / y = x/2\}$$

$$R = \{(10; 5), (14; 7), (18; 9)\}$$

Rpta. A

Resolución 5

$$L = \{-3; -1; 1; 3; 5\}$$

$$N = \{-11; -7; -3; 1; 5\}$$

$$R = \{(x, y) \in L \times N / y = 2x + 3\}$$

$$R = \{(-3; 3), (-1; 1), (1; 5)\}$$

$$\text{Dominio} = \{-3; -1; 1\}$$

$$\text{Rango} = \{-3; 1; 5\}$$

Rpta. C

Resolución 6

$$1 \leq x \leq 8$$

$$3 \leq 3x \leq 24$$

$$10 \leq 3x + 7 \leq 31$$

$$f(x) \in [10; 31]$$

Rpta. D

Resolución 7

$$(2x + 1; 5) = (7; \frac{3y - 2}{2})$$

$$2x + 1 = 7 \quad \wedge \quad \frac{3y - 2}{2} = 5$$

$$x = 3$$

$$y = 4$$

$$\therefore x + y = 7$$

Rpta. C

Resolución 8

$$A = \{2; 3; 4\}$$

$$R = \{(2;a), (2;3), (b;4), (3;c), (3;3)\}$$

$$2 \in A \Rightarrow (2;2) \in R$$

$$3 \in A \Rightarrow (3;3) \in R$$

$$4 \in A \Rightarrow (4;4) \in R$$

$$a = 2 \wedge b = 4 \wedge c = 3$$

$$\therefore a + b + c = 9$$

Rpta. D

Resolución 9

$$A = \{x/x \text{ es un ser humano}\}$$

$$R_1 = \{(x;y) / x \text{ es hermano de } y\} \dots \text{simétrica}$$

$$xR_1 y \Rightarrow yR_1 x$$

$$R_2 = \{(x;y) / x \text{ es de la misma raza que } y\} \dots \text{simétrica}$$

$$xR_2 y \Rightarrow yR_2 x$$

$$R_3 = \{(x;y) / x \text{ es el padre de } y\}$$

$$xR y \Rightarrow y \not R x$$

$$\therefore \text{son simétricas } R_1 \text{ y } R_2$$

Rpta. D

Resolución 10

$$A = \{2; 3; 4; 5; 6; 7\}$$

$$R_1 = \{(a, b) / a + 2 = b\}$$

$$R_1 = \{(2;4), (3;5), (4;6), (5;7)\}$$

$$\text{Dom}(R_1) = \{2;3;4;5\}$$

$$n(\text{Dom}R_1) = 4$$

$$R_2 = \{(a, b) / a + 3 = b\}$$

$$R_2 = \{(2;5), (3;6), (4;7)\}$$

$$\text{Dom}(R_2) = \{2;3;4\}$$

$$n(\text{Dom}R_2) = 3$$

$$\therefore n(\text{Dom}R_1) + n(\text{Dom}R_2) = 7$$

Rpta. C

Resolución 11

$$A = \{2n + 1 / 1 < n < 6; n \in \mathbb{Z}^+\}$$

$$A = \{5;7;9;11\}$$

$$R = \{(a;a), (b;b), (c;a), (9;c), (c;c), (c + b - 1; 11)\}$$

$$\therefore (c,a) \text{ reflexiva } (9,c) \Rightarrow a = 9$$

$$\therefore (b;b) = (7,7)$$

$$\therefore (c;c) = (5;5)$$

$$\therefore a = 9; b = 7; c = 5$$

$$a + b + c = 21$$

Rpta. A

Resolución 12

$$A = \{2; 3; 4; 7\}$$

$$R = \{(2;3), (2;4), (4;4), (a;3), (b;a - 1), (c;c)\}$$

$$a = 3 \wedge b = 2 \wedge c = 7$$

$$\therefore (a + b + c) = 12; \text{ no es transitiva}$$

Rpta. C

Resolución 13

$$R = \{(2;3), (4;9), (3;b), (a+b;9), (9;c+1)\}$$

es simétrica:

$$2R3 \wedge 3R2 \Rightarrow b = 2$$

$$4R9 \wedge 9R4 \Rightarrow c = 3$$

$$(a + b;9) = (9;9) \Rightarrow a = 7$$

$$\therefore a + b + c = 12$$

Rpta. C

Resolución 14

$$R = \{(4;4), (a;a), (b;b), (4;5), (5;c), (5;6), (e;e+2), (6;4), (d;5)\}$$

$$\text{es reflexiva: } \{(4;4), (a;a), (b;b)\} \Rightarrow a = 5 \wedge b = 6$$

Es simétrica

$$4R5 \wedge 5R4 \Rightarrow c = 4$$

$$5R6 \wedge 6R5 \Rightarrow d = 6$$

$$4R6 \wedge 6R4 \Rightarrow e = 4$$

Es transitiva

$$4R5 \wedge 5R6 \Rightarrow (4;6) \in R$$

$$5R6 \wedge 6R5 \Rightarrow (5;5) \in R; \text{ etc}$$

$$\therefore a + b + c + d + e = 25$$

Rpta. E

Resolución 15

$$A = \{3x + 4 / -6 < x \leq 1; x \in \mathbb{Z}\}$$

$$A = \{-11; -8; -5; -2; 1; 4; 7\}$$

$$B = \{\frac{x-2}{2} / -6 \leq x < 3; x \in \mathbb{Z}\}$$

$$B = \{-4; -\frac{7}{2}; -3; -\frac{5}{2}; -2; -\frac{3}{2}; -1; -\frac{1}{2}; 0\}$$

$$R = \{(x;y) \in A \times B / y = \frac{x+5}{2}\}$$

$$R = \{(-11;-3), (-8;-3/2), (-5;0)\}$$

Rpta. D

Resolución 16

$$T = \{2x^2 - 10 / -3 \leq x < 4; x \in \mathbb{Z}\}$$

$$T = \{8; -2; -8; -10\}$$

$$R = \{(x; y) \in T \times \mathbb{N} / y = 4 - 2x\}$$

$$R = \{(-2; 8), (-8; 20), (-10; 24)\}$$

$$\text{Dom}(R) = \{-2; -8; -10\}$$

Rpta. E

Resolución 17

$$\{(a; 3b), (a; a+b), (2b; 12)\} \rightarrow \text{función}$$

$$a + b = 3b \quad \wedge \quad 3b = 12$$

$$a = 2b \quad b = 4 \quad \wedge \quad a = 8$$

$$\therefore a - b = 4$$

Rpta. C

Resolución 18

$$- g(x) = 2x + 13 \Rightarrow g(-7) = -1$$

$$- f(x) = 4x - 1 \Rightarrow f(-1) = -5$$

Rpta. E

Resolución 19

$$-3 < x \leq 6$$

$$-1 < \frac{1}{3}x \leq 2$$

$$-5 < \frac{1}{3}x - 4 \leq -2$$

$$-5 < h(x) \leq -2$$

$$\therefore h(x) \in (-5; -2]$$

Rpta. E

Resolución 20

$$y = -x^2 + 2x - 1$$

$$xv = \frac{-b}{2a} = \frac{-2}{2(-1)} \Rightarrow xv = 1$$

$$yv = -(1)^2 + 2(1) - 1 \Rightarrow yv = 0$$

$$\therefore \text{vértice} = (1; 0)$$

Rpta. C

Resolución 21

$$f(x) = x^2 + 3$$

$$f(10) = 10^2 + 3 \Rightarrow f(10) = 103$$

$$f(\sqrt{40}) = \sqrt{40}^2 + 3 \Rightarrow f(\sqrt{40}) = 43$$

$$f(\sqrt{20}) = \sqrt{20}^2 + 3 \Rightarrow f(\sqrt{20}) = 23$$

$$\therefore \sqrt{f(10) + f(\sqrt{40}) + f(\sqrt{20})} = 13$$

Rpta. B

Resolución 22

$$R = \{(1; 2), (2; 1), (a; a), (c; c), (2; 3), (1; b)\}$$

es transitiva

$$1R2 \wedge 2R1 \Rightarrow (1; 1) \in R \rightarrow a = 1$$

$$1R2 \wedge 2R3 \Rightarrow (1; 3) \in R \rightarrow b = 3$$

$$2R1 \wedge 1R2 \Rightarrow (2; 2) \in R \rightarrow c = 2$$

$$\therefore a + b + c = 6$$

Rpta. C

Resolución 23

$$2a + b = 5 \quad \dots(1)$$

$$3b - 1 = 8 \quad \dots(2)$$

$$\text{De (2)} \quad b = 3$$

$$\text{De (1)} \quad a = 1$$

$$\therefore a + b = 4$$

Rpta. D

Resolución 24

$$a - 2 = 1 \rightarrow a = 3$$

$$b + 3 = 5 \rightarrow b = 2$$

$$R = \{(1; 1), (3; 3), (5; 5), (1; 3), (3; 1)\}$$

I. R es simétrica (V)

II. R es transitiva (V)

III. R es de equivalencia (V)

Rpta. E

Resolución 25

$$(+1; +3)$$

$$x \quad y$$

Reemplazando:

$$(2a - b)(1) - 3(3) + b - 5 = 0$$

$$2a - b + -9 + b - 5 = 0$$

$$2a - 14 = 0$$

$$2a = 14$$

$$a = 7$$

Rpta. C

UNIDAD 4

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 1

$$5x^{2a-b+3}y^{3b+1}$$

$$GR(y) = 16$$

$$3b + 1 = 16 \Rightarrow b = 5$$

Rpta. C

Resolución 2

$$9xy^{3b-1}; 5xy^{11}$$

$$3b - 1 = 11$$

$$b = 4$$

Rpta. B

Resolución 3

$$P(x; y) = 12x^{3n+2}y^6$$

$$GA = 14$$

$$3n + 2 + 6 = 14 \Rightarrow n = 2$$

Rpta. A

Resolución 4

$$(x^5y^a)(x^4y^3)$$

$$x^9y^{a+3}$$

$$GA = 17$$

$$9 + a + 3 = 17 \Rightarrow a = 5$$

Rpta. C

Resolución 5

$$R(x; y) = \frac{x^{6-m}y^{9+n}}{x^{2-m}}$$

$$R(x; y) = x^4y^{9+n}$$

$$GA = 21$$

$$4 + 9 + n = 21 \Rightarrow n = 8$$

Rpta. C

Resolución 6

$$P(x; y) = 3x^{a-8}y^6 + 4x^{a-11}y^5 + 7x^{a-13}y^{20}$$

$$GR(x) = 5$$

$$a - 8 = 5 \Rightarrow a = 13$$

$$\therefore GA = a - 13 + 20$$

$$GA = 20$$

Rpta. B

Resolución 7

$$\frac{\left[(x^5)^3 \cdot x^4\right]^2 \cdot x^3}{\left[(x^2)^4 \cdot x^5\right]^3} = \frac{x^{38} \cdot x^3}{x^{39}}$$

$$x^2$$

$$\therefore \text{El grado es } 2$$

Rpta. B

Resolución 8

$$P(x; y) = 6x^{m+2}y^{n+3} + 4x^{m+1}y^{2n-1}$$

$$m + 2 + n + 3 = m + 1 + 2n - 1$$

$$n = 5$$

Rpta. C

Resolución 9

$$P(x - 5) = 5x + 5$$

$$\cdot P(-1) = 5(4) + 5 \Rightarrow P(-1) = 25$$

$$\cdot P(0) = 5(5) + 5 \Rightarrow P(0) = 30$$

$$\cdot P(1) = 5(6) + 5 \Rightarrow P(1) = 35$$

$$\cdot P(-2) = 5(3) + 5 \Rightarrow P(-2) = 20$$

$$\therefore R = \frac{P(-1) + P(0)}{P(1) + P(-2)} = \frac{25 + 30}{35 + 20}$$

$$R = 1$$

Rpta. B

Resolución 10

$$P(x) = 2x + 3$$

$$\cdot P(2) = 2(2) + 3 \Rightarrow P(2) = 7$$

$$\cdot P(7) = 2(7) + 3 \Rightarrow P[P(2)] = 17$$

Rpta. D

Resolución 11

$$P(x + 1) = x^2$$

$$\cdot P(2) = 1^2 \Rightarrow P(2) = 1$$

$$\cdot P(1) = 0^2 \Rightarrow P(P(2)) = 0$$

$$\cdot P(0) = (-1)^2 \Rightarrow P[P(P(2))] = 1$$

Rpta. B

Resolución 12

$$P(x) = x^{a+2} - 2x^{a+3} + x^{a+6}$$

$$GA = 14$$

$$a + 6 = 14 \Rightarrow a = 8$$

Rpta. C

Resolución 13

$$Q(x; y) = x^{a+3}y^{b-1} - x^{a-2}y^b$$

$$GR(x) = 8 \wedge GR(y) = 4$$

$$a + 3 = 8$$

$$b = 4$$

$$a = 5$$

$$\therefore a + b = 9$$

Rpta. B

Resolución 14

$$P(3x - 1) = x + 6$$

$$P(5) = 2 + 6 \Rightarrow P(5) = 8$$

$$P(-4) = -1 + 6 \Rightarrow P(-4) = 5$$

$$\therefore P(5) + P(-4) = 13$$

Rpta. E

Resolución 15

$$P(x; y) = 3x^a y^4 - x^7 y^3 + xy^b$$

$$a + 4 = 10 \Rightarrow 1 + b$$

$$a = 6 \quad \wedge \quad b = 9$$

$$\therefore \boxed{a + b = 15}$$

Rpta. D

Resolución 16

$$P(x) = 4x^2 + bx - 3 - ax^2 + 2x + 3c$$

$$P(x) = (4-a)x^2 + (b+2)x + (3c-3) \rightarrow \text{Nulo}$$

$$4-a=0 \quad \wedge \quad b+2=0 \quad \wedge \quad 3c-3=0$$

$$a=4 \quad b=-2 \quad c=1$$

$$\therefore \boxed{a+b+c=3}$$

Rpta. A

Resolución 17

$$P(x; y) = x^{2a} y^{b+3} + x^6 y^5 + x^{b+1} y^4$$

$$2a + b + 3 = 11 \Rightarrow b + 3$$

$$b = 6 \quad \wedge \quad a = 1$$

$$\therefore \boxed{a \cdot b = 6}$$

Rpta. E

Resolución 18

$$(5x^{n+4} y^2)^5$$

$$(n+4+2)5 = 40$$

$$\boxed{n = 2}$$

Rpta. B

Resolución 19

$$\left. \begin{aligned} A &= 2m x^{m+2} y^{3m+n} \\ B &= 3n x^{3n-2} y^{4m-8} \end{aligned} \right\} \text{Semejantes}$$

$$m+2 = 3n-2 \quad \wedge \quad 3m+n = 4m-8$$

$$8+n+4 = 3n \quad 8+n = m$$

$$n = 6 \quad m = 14$$

$$\therefore A - B = 28x^{16} y^{48} - 18x^{16} y^{48}$$

$$\boxed{A - B = 10x^{16} y^{48}}$$

Rpta. B

Resolución 20

$$9x^b + 4ax^5 = 17x^5$$

$$b = 5 \quad \wedge \quad 9 + 4a = 17$$

$$a = 2$$

$$\therefore \boxed{\sqrt{2a+b} = 3}$$

Rpta. B

Resolución 21

$$P(x; y) = (5^{a-1} \cdot x^{a+2} y^a)^2$$

$$(a+2+a)2 = 16$$

$$a = 3$$

$$\therefore \text{Coeficiente} = 5^{2(a-1)}$$

$$\boxed{\text{Coef.} = 625}$$

Rpta. C

Resolución 22

$$P(x) = \frac{(x^{n-4})^3 \cdot (x^{4n})^2}{(x^{n-2})^4 \cdot x^{6n}} ; \quad GA = 4$$

$$P(x) = \frac{x^{11n-12}}{x^{10n-8}} = x^{n-4}$$

$$\therefore n-4 = 4$$

$$\boxed{n = 8}$$

Rpta. C

Resolución 23

$$Q(x) = 5x^6 + x^4 + x^2 + 3x + 6$$

$$GA [Q(x)]^5 = 5 \cdot 6$$

$$\boxed{GA = 30}$$

Rpta. C

Aplica tus aprendizajes 2

Resolución 1

$$Q(x; y; z) = 8x^4 y z^6$$

$$\left. \begin{array}{l} 6R(y) = 1 \\ 6R(z) = 6 \end{array} \right\} + \boxed{7}$$

Rpta. C

Resolución 2

$$\begin{aligned} & -5a(a+2) - 6a(a-3) + 3a(a-2) + 8a^2 \\ & -5a^2 - 10a - 6a^2 + 18a + 3a^2 - 6a + 8a^2 \\ & \quad \boxed{2a} \end{aligned}$$

Rpta. A

Resolución 3

$$E = -x - (-x - y) - (-y + x) - y$$

$$E = \cancel{-x} + \cancel{x} + \cancel{y} + y - \cancel{x} - \cancel{y}$$

$$\boxed{E = y - x}$$

Rpta. B

Resolución 4

$$P(x; y; z) = \frac{6x^3 y^2 z^5}{GA=10} - \frac{9x^2 y^6 z^4}{GA=12} + \frac{13xy^7 z^5}{GA=13}$$

$$\therefore \boxed{GA = 13}$$

Rpta. C

Resolución 5

$$x^{-y} \cdot (-2y)^x ; \quad x = 3 \quad \wedge \quad y = -1$$

$$3^{-(-1)} \cdot (-2(-1))^3 = 3 \cdot 8 = \boxed{24}$$

Rpta. B

Resolución 6

$$E = (a^a + c^a - b^a)^a ; \quad a = 2, \quad b = -3 \quad \wedge \quad c = 4$$

$$E = (2^2 + 4^2 - (-3)^2)^2$$

$$\boxed{E = 121}$$

Rpta. C

Resolución 7

$$P(x; y) = x^5 - x^4 y^3 + x^2 y^6$$

$$\begin{array}{l} GR(x) + GR(y) \\ 5 + 6 = \end{array} \boxed{11}$$

Rpta. A

Resolución 8

$$\begin{aligned} & [(2p-3) - (3p+4q)] - [2q - (3p+q) - p] \\ & - 3 - p - 4q - q + 4p \\ & \quad \boxed{3p - 5q - 3} \end{aligned}$$

Rpta. B

Resolución 9

$$R = 3x - \overline{y + 2x} - \overline{x - (3y + 2x)} - (x + y)$$

$$R = 3x - y - 2x - (x - 3y - 2x - x - y)$$

$$R = x - y + 2x + 4y$$

$$\boxed{R = 3x + 3y}$$

Rpta. C

Resolución 10

$$P(x) = 3x^{90} - 27x^{88} + 3x^2 - 4x$$

$$P(3) = 3 \cdot 3^{90} - 27 \cdot 3^{88} + 3 \cdot 3^2 - 4 \cdot 3$$

$$P(3) = 3^{91} - 3^3 \cdot 3^{88} + 3 \cdot 3^2 - 4 \cdot 3$$

$$P(3) = 3^{91} - 3^{91} + 27 - 12$$

$$\boxed{P(3) = 15}$$

Rpta. C

Resolución 11

$$N(3) = 2(3) - 5 = 1$$

$$R(1) = 4(1) + 3 = \boxed{7}$$

Rpta. C

Resolución 12

VFV

Rpta. C

Resolución 13

$$E = [19 - 10]^{5-4} = [9]^1 = [9]$$

$$\boxed{E = 9}$$

Rpta. D

Resolución 14

Rpta. C

Aplica tus aprendizajes 3

Resolución 1

$$Q(x) = 3m x^m + 6m x^{m-1} + 11m x^{m-2}$$

$$\left. \begin{array}{l} GA = 6 \\ m = 6 \end{array} \right\} \text{Semejantes}$$

$$\therefore \text{Coef. mayor} = 11m$$

$$\boxed{\text{Coef. mayor} = 66}$$

Rpta. D

Resolución 2

$$M = a^3 x^{a+8} y^{b-4}$$

$$N = b^2 x^{b+5} y^{-a+5}$$

$$a+8 = b+5 \quad \wedge \quad b-4 = -a+5$$

$$a-b = -3 \dots (I) \quad a+b = 9 \dots (II)$$

Sumamos I y II:

$$2a = 6$$

$$a = 3 \quad \wedge \quad b = 6$$

$$\therefore \boxed{a \times b = 18}$$

Rpta. B

Resolución 3

$$Q(x; y) = a^{-2} \sqrt{x^{3a} \cdot y^6}$$

$$Q(x; y) = (a^{3a} \cdot y^6)^{1/a-2}$$

$$\frac{3a+6}{a-2} = 9$$

$$3a+6 = 9a-18$$

$$\boxed{a = 4}$$

Rpta. B

Resolución 4

$$A(x; y) = 4x^{a+4} y^8$$

$$B(x; y) = -2x^9 y^{b-1}$$

$$a+4 = 9 \quad \wedge \quad b-1 = 8$$

$$a = 5 \quad b = 9$$

$$\therefore \boxed{a \cdot b = 45}$$

Rpta. C

Resolución 5

$$P(x) = (a-4)x^2 + (b-2)x + c-5 \rightarrow \text{Nulo}$$

$$a-4=0 \quad \wedge \quad b-2=0 \quad \wedge \quad c-5=0$$

$$a=4 \quad \wedge \quad b=2 \quad \wedge \quad c=5$$

$$\therefore \boxed{a \cdot b \cdot c = 40}$$

Rpta. A

Resolución 6

$$M(x; y) = 10 x^{3a+b} y^{a+3b}$$

$$GR(x) = 11 \quad \wedge \quad GA = 20$$

$$3a+b=11 \quad 4a+4b=20$$

$$a=3 \quad b=5-a$$

$$b=2$$

$$\therefore \boxed{a+b=5}$$

Rpta. B

Resolución 7

$$R = 2a-3 \sqrt{x^{3a} \cdot y^6} \quad ; \quad GA = 3$$

$$\frac{3a+6}{2a-3} = 3$$

$$3a+6 = 6a-9$$

$$a=5$$

$$\therefore P = 3x^{2a} y^{3a-1}$$

$$GA = 5a-1$$

$$\boxed{GA = 24}$$

Rpta. C

Resolución 8

$$P(x) = 4 \sqrt{x^{3m} \cdot 3 \sqrt{x^{2m}}}$$

$$P(x) = x^{3m/4} \cdot x^{2m/12}$$

$$\frac{3}{4}m + \frac{2}{12}m = 22$$

$$11m = 22 \cdot 12$$

$$\boxed{m = 24}$$

Rpta. D

Resolución 9

$$M(x; y) = \frac{x^{3+m} y^{7-n}}{x^{3-n} y^{6-m}}$$

$$M(x; y) = x^{m+n} \cdot y^{1-n+m}$$

$$GA = 7 \quad \wedge \quad GR(x) = 5$$

$$2m+1=7 \quad m+n=5$$

$$m=3 \quad n=2$$

$$\therefore \boxed{2m+n=8}$$

Rpta. D

Resolución 10

$$Q(x; y) = 15x^4 y^{3n} - x^{4n} y^6 + 8(x^3 y^2)^{6n}$$

$$Q(x; y) = 15x^4 y^{3n} - x^{4n} y^6 + 8x^{18n} y^{12n}$$

$$GR(y) = 24$$

$$12n = 24$$

$$n = 2$$

$$\therefore GR(x) = 18n$$

$$\boxed{GR(x) = 36}$$

Rpta. C

Resolución 11

$$A(x) = 3(n-1) \cdot \sqrt[6]{x^{2n}} \cdot \sqrt{x^8}$$

$$GA = 3$$

$$\frac{n}{3} + \frac{2}{3} = 3$$

$$n = 7$$

$$\therefore \text{Coef.} = 3(n-1)$$

$$\boxed{\text{Coef.} = 18}$$

Rpta. C

Resolución 12

$$P(x) = 3ax^{a+5} + 5ax^{a+6} + 2ax^{a+8}$$

$$GA = 17$$

$$a + 8 = 17$$

$$a = 9$$

$$\therefore 3a + 5a + 2a = 10a = \boxed{90}$$

Rpta. E

Resolución 13

$$F(x) = ax + b$$

$$F(2) \rightarrow 2a + b = 5$$

$$F(1) \rightarrow a + b = 4$$

$$\Rightarrow a = 1 \wedge b = 3$$

$$F(7) = 1(7) + 3 = 10$$

Rpta. B

Resolución 14

$$R(x) = ax + b$$

$$\begin{cases} \cdot R(-3) = -3a + b = 8 \\ \cdot R(-2) = -2a + b = 6 \end{cases} \Rightarrow \begin{cases} a = -2 \\ b = 2 \end{cases}$$

$$\therefore R(-4) = (-2)(-4) + 2$$

$$\boxed{R(-4) = 10}$$

Rpta. C

Resolución 15

$$P(x; y) = 3x^{m+1}y^{n-3} + 7x^{m+3}y^{n-4} - x^{m+4}y^{2n}$$

$$GR(x) = 10 \quad \wedge \quad GA = 16$$

$$m + 4 = 10 \quad 2n + 10 = 16$$

$$m = 6 \quad n = 3$$

$$\therefore \boxed{\frac{m}{n} = 2}$$

Rpta. A

Resolución 16

$$Q(x) = 2mx^m + 4mx^{m-1} + 6mx^{m-2}$$

$$GA = 5$$

$$m = 5$$

$$\therefore \text{Coef.} = 6m$$

$$\boxed{\text{Coef.} = 30}$$

Rpta. D

Resolución 17

$$P(x; y) = x^{5m+2n+3}y^{2m+1} + x^{4m+2n+1}y^{3m+2} + 7x^{3m+2n}y^{4m+5}$$

$$2m + 1 = 7 \quad \wedge \quad GR(x) + GR(y) = 43$$

$$m = 3 \quad 5m + 2n + 3 + 4m + 5 = 43$$

$$n = 4$$

$$\therefore GA = 7m + 2n + 5$$

$$\boxed{GA = 34}$$

Rpta. D

Resolución 18

$$P(x; y) = 8x^{2n+6} - 3x^{2n+3}y^{n+2} + 5y^{9-n}$$

$$2n + 6 = 3n + 5 = 9 - n$$

$$n = 1$$

$$\therefore GR(y) = 9 - n$$

$$\boxed{GR(y) = 8}$$

Rpta. B

Resolución 19

$$Q(x; y) = x^{n^2+1} + 6x^{n+2}y^{n-1} - 13y^{7-m}$$

$$n^2 + 1 = 2n + 1 = 7 - m$$

$$n = 2 \quad \wedge \quad m = 2$$

$$\therefore \boxed{m^n = 4}$$

Rpta. B

Resolución 20

$$P(x; y) = (6-n)x^3y + mx^2y^3 + 5x^3y - 4x^2y^3$$

$$P(x; y) = (11-n)x^3y + (m-4)x^2y^3 \rightarrow \text{Nulo}$$

$$11 - n = 0 \quad \wedge \quad m - 4 = 0$$

$$n = 11 \quad m = 4$$

$$\therefore \boxed{(m\sqrt{n-2})^2 = 3}$$

Rpta. B

Aplica tus aprendizajes 4

Resolución 1

$$\begin{aligned} A &= x^2 + 3x - 4 \\ B &= 2x^2 - 4x + 1 \\ C &= -2x - x^2 - 3 \end{aligned}$$

$$\therefore B + C - A = -9x + 2$$

Rpta. D

Resolución 2

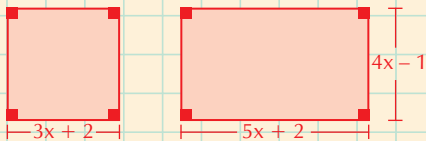
$$\begin{aligned} A &= 4x^3 - 2x + 1 \\ B &= x^3 - 3x^2 + 6 \\ C &= x^2 - 3x^3 + 4 \end{aligned}$$

$$\therefore A - B + C = 3x^3 + 3x^2 - 2x - 5 + x^2 - 3x^3 + 4$$

$$A - B + C = 4x^2 - 2x - 1$$

Rpta. C

Resolución 3

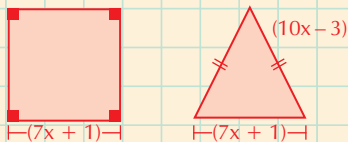


$$\begin{aligned} 2p_{\square} &= 4(3x + 2) \quad \wedge \quad 2p_{\square} = 2(5x + 2) + 2(4x - 1) \\ 2p_{\square} &= 12x + 8 \quad \quad \quad 2p_{\square} = 18x + 2 \end{aligned}$$

$$\therefore 2p_{\square} + 2p_{\square} = 30x + 10$$

Rpta. D

Resolución 4



$$\begin{aligned} 2p_{\square} &= 4(7x + 1) \quad \wedge \quad 2p_{\triangle} = 2(10x - 3) + 7x + 1 \\ 2p_{\square} &= 28x + 4 \quad \quad \quad 2p_{\triangle} = 27x - 5 \end{aligned}$$

$$\therefore 2p_{\square} + 2p_{\triangle} = 55x - 1$$

Rpta. D

Resolución 5

$$5x^2 - 3x + 6 + n = 8x^2 + 5x - 3$$

$$n = 3x^2 + 8x - 9$$

Rpta. C

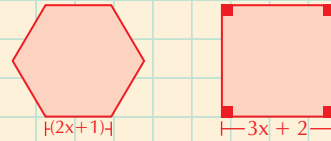
Resolución 6

$$16x^3 - 4x^2 - 9 - n = 12x^3 + 6x - 8$$

$$n = 4x^3 - 4x^2 - 6x - 1$$

Rpta. E

Resolución 7

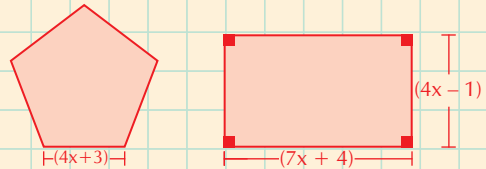


$$\begin{aligned} 2p_{\square} - n &= 2p_{\square} \\ 6(2x + 1) - n &= 4(3x + 1) \end{aligned}$$

$$n = 10$$

Rpta. E

Resolución 8



$$\begin{aligned} 2p_{\square} - n &= 2p_{\square} \\ 5(4x + 3) - n &= 2(7x + 4) + 2(3x + 1) \end{aligned}$$

$$n = 5$$

Rpta. D

Resolución 9

$$\begin{aligned} R &= -3x^2 - \{5y + [-3x^2 + \{y - (6 + x^2)\} - (-x^2 + y)]\} \\ R &= -3x^2 - \{5y + [-3x^2 - 6]\} \end{aligned}$$

$$R = -5y + 6$$

Rpta. B

Resolución 10

$$E = x - 3x + 2(-x + 1) + 2$$

$$E = x - 3x + 2x - 2 - 2$$

$$E = -4$$

Rpta. E

Resolución 11

$$P = x + \{(-2x + y) - \overline{-x + y - z} + x\} - z$$

$$P = x + \{-2x + y - x + y - z + x\} - z$$

$$R = x$$

Rpta. C

Resolución 12

$$Ax^2 + 5x + 8 + 3x^2 + Bx - 6 = 5x^2 + 7x + 2$$

$$(A + 3)x^2 + (5 + B)x + 2 = 5x^2 + 7x + 2$$

$$A + 3 + 5 + B = 5 + 7$$

$$A + B = 4$$

Rpta. D

Resolución 13

$$Mx^3 + 5x^2 + 2x + 4 - (6x^3 + Nx^2 + 5x + 3) = 2x^3 + 3x^2 - 3x + 1$$

$$(M - 6)x^3 + (5 - N)x^2 - 3x + 1 = 2x^3 + 3x^2 - 3x + 1$$

$$M - 6 + 5 - N = 2 + 3$$

$$M - N = 6$$

Rpta. B

Resolución 14

$$2x^2 - 3x + 5 + n = 7x^2 + x - 4$$

$$n = 5x^2 + 4x - 9$$

Rpta. E

Resolución 15

$$-4xy + x^2y + 5xy^2 - (4x^2y - 3xy^2 + 2xy)$$

$$-3x^2y + 8xy^2 - 6xy$$

Rpta. A

Resolución 16

$$P = 3x^3 + 4x^2 + 2$$

$$Q = 21x^2 + 4x + 1$$

$$P + Q = 3x^3 + 25x^2 + 4x + 3$$

 $\therefore$ coef. de mayor grado - coef. de menor grado

$$3 - 3 = 0$$

Rpta. C

Resolución 17

$$A = 5x^4 - 3x^3 + 5x + 1$$

$$B = 7x^4 + 2x^2 - 6$$

$$A - B = -2x^4 - 3x^3 - 2x^2 + 5x + 7$$

 $\therefore$ coef. de mayor grado + coef. de menor grado

$$-2 + 7 = 5$$

Rpta. C

Resolución 18

$$4x^3 + 3x - 6 - (5x^3 - 2x^2 + 4x - 4) + Q = 2x^2 + x - 2$$

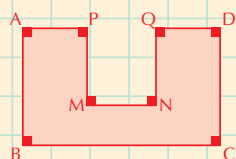
$$-x^3 + 2x^2 - x - 2 + Q = 2x^2 + x - 2$$

$$Q = x^3 + 2x$$

$$Q = x(x^2 + 2)$$

Rpta. B

Resolución 19



$$AB = 4x + 1 = CD$$

$$BC = 6x + 4 = AP + MN + QD$$

$$PM = 3x + 2 = QN$$

$$2p = AB + AP + MN + QD + PM + QN + CD + BC$$

$$2p = 4x + 1 + 6x + 4 + 3x + 2 + 3x + 2 + 4x + 1 + 6x + 4$$

$$2p = 26x + 14$$

Rpta. C

Resolución 20

$$R = -[(-x)] - [+(-x)] + \{ -(-y + z) - [+(-z)] \}$$

$$R = -x + x + \{ y - z + z \}$$

$$R = y$$

Rpta. D

Resolución 21

$$Q = -[-3x + (-x - \{2y - 3\})] + \{ -(2x + y) + (-x - 3) + 2 - (x + y) \}$$

$$Q = -[-4x - 2y + 3] + \{ -4y - 2y - 1 \}$$

$$Q = -4$$

Rpta. D

Resolución 22

$$(Ax^2 - xy + y^2 + 2x^2 + Bxy - 3y^2) - (3x^2 - xy - c^2) = 3x^2 + 2xy + (A-1)x^2 + Bxy + (c-2)y^2 = 3x^2 + 2xy + y^2$$

$$A - 1 = 3 \quad \wedge \quad B = 2 \quad \wedge \quad C - 2 = 1$$

$$A = 4$$

$$C = 3$$

$$\therefore A + B + C = 9$$

Rpta. C

Resolución 23

$$(6x^2 + 11x - 35 + 3x^2 - 6x) - (9x^2 + 3x - 29) = mx + n$$

$$2x - 6 = mx + n$$

$$\therefore m + n = 2 - 6$$

$$m + n = -4$$

Rpta. B

Resolución 24

$$E = -5(x+y) - 2x - y + 2(-x+y-3 - \overline{x-y-1}) + 2x$$

$$E = -5x - 5y - 2x + y + 2x - 2y + 6 + 2x - 2y - 2 + 2x$$

$$E = -x - 8y + 4$$

Rpta. A

Resolución 25

$$A = ax^2 + bx + c$$

$$B = 6x^2 - 3x + 5$$

$$C = 9x^2 + 2x + 7$$

$$A + B = C$$

$$(6 + a)x^2 + (b - 3)x + (c + 5) = 9x^2 + 2x + 7$$

$$\rightarrow 6 + a + b - 3 + c + 5 = 9 + 2 + 7$$

$$a + b + c = 10$$

Rpta. C

Resolución 26

$$(4x^3 - 11x + 2 - (2x^3 - x - 9)) + Q = 2x^3 + x - 5$$

$$2x^3 - 10x + 11 + Q = 2x^3 + x - 5$$

$$Q = 11x - 16$$

Rpta. B

Resolución 27

$$P = 3x^2 + 5y^2 + 8xy$$

$$Q = 2y^2 + 5x^2 + xy$$

$$R = x^2 - y^2 + xy$$

$$P + Q + R = 9x^2 + 6y^2 + 10xy$$

$$\therefore \text{Suma coef.} = 25$$

Rpta. B

Resolución 28

$$A = 6x^2y + 3xy^2 - 12xy$$

$$B = 2xy^2 + 16xy - 4x^2y$$

$$C = 4xy - 5xy^2 + x^2y$$

$$A + B + C = 3x^2y + 8xy$$

$$\therefore \text{Suma coef.} = 11$$

Rpta. B

Aplica tus aprendizajes 5

Resolución 1

$$\begin{aligned} P(x; y) &= 3x + y + 6 \\ Q(x; y) &= -3y + x - 9 \\ \therefore 3P(x; y) + Q(x; y) \\ 9x + 3y + 18 + x - 3y - 9 \\ \boxed{10x + 9} \end{aligned}$$

Rpta. C

Resolución 2

$$\begin{aligned} P(x; y) &= 5x + 3y - 3 \\ Q(x; y) &= 2y - 2x + 5 \\ \therefore 2P(x; y) + 5Q(x; y) \\ 10x + 6y - 6 + 10y - 10x + 25 \\ \boxed{16y + 19} \end{aligned}$$

Rpta. C

Resolución 3

$$\begin{aligned} P(x) &= 5x^2 - 3x + 1 \\ Q(x) &= x^2 - 3 \\ \therefore P(x) - Q(x) &= 4x^2 - 3x + 4 \end{aligned}$$

Rpta. E

Resolución 4

$$\begin{aligned} P &= 4x^3 + 2x^2 - x + 5 \\ Q &= -3x^2 + 2x + 3 \\ \therefore P + Q &= 4x^3 - x^2 + x + 8 \\ \text{Tiene 4 términos} \end{aligned}$$

Rpta. B

Resolución 5

$$\begin{aligned} A &= 5x^2 + 6x - 2 \\ B &= -2x^2 + 6x + 1 \\ \therefore A - B &= 7x^2 - 3 \\ \text{Tiene 2 términos} \end{aligned}$$

Rpta. C

Resolución 6

$$\begin{aligned} P &= x^2 + x - 3 \\ Q &= 2x^2 - 2x + 1 \\ R &= 3x^2 - 4x + 5 \\ \therefore (P + Q) - R &= 3x^2 - x - 2 - 3x^2 + 4x - 5 \\ \boxed{(P + Q) - R = 3x - 7} \end{aligned}$$

Rpta. B

Resolución 7

$$\begin{aligned} A &= 5x^2 - x + 4 \\ B &= 3x^2 - 4x + 1 \\ C &= 2x^2 + 5x + 3 \\ \therefore (A - C) - B &= 3x^2 - 6x + 1 - 3x^2 + 4x - 1 \\ \boxed{(A - C) - B = -2x} \end{aligned}$$

Rpta. B

Resolución 8

$$\begin{aligned} P(x; y) &= 2x^2 - 2x + 3y^2 - 3 \\ Q(x; y) &= 4x - 4x^2 - 3y^2 + 6 \\ \therefore 2P(x; y) + Q(x; y) \\ \cancel{4x^2} - 4x + \cancel{6y^2} - 6 + 4x - \cancel{4x^2} - 3y^2 + 6 \\ \boxed{3y^2} \end{aligned}$$

Rpta. C

Resolución 9

$$\begin{aligned} A(x; y) &= 8xy^2 + 6x^2y - 3xy + 8 \\ B(x; y) &= 4x^2y + 2x^2y + xy + 5 \\ \therefore A(x; y) - 2B(x; y) \\ \cancel{8xy^2} + 6x^2y - 3xy + 8 - \cancel{8xy^2} - 4x^2y - 2xy - 10 \\ \boxed{2x^2y - 5xy - 2} \end{aligned}$$

Rpta. B

Resolución 10

$$\begin{aligned} P(x) &= 4x^3 + 2x^2 + x + 3 \\ Q(x) &= 5x^2 - 4x - 4 \\ \therefore P(x) - Q(x) &= 4x^3 - 3x^2 + 5x + 7 \end{aligned}$$

Rpta. B

Resolución 11

$$\begin{aligned} P &= 5x^3 + 2x^2 - x + 6 \\ Q &= -2x^2 + x + 3 \\ \therefore P + Q &= 5x^3 + 9 \\ \rightarrow \text{Tiene 2 términos} \end{aligned}$$

Rpta. C

Resolución 12

$$\begin{aligned} A &= 6x^4 + 5x^3 + 2x^2 + x - 8 \\ B &= 5x^3 + x + 2x^2 + 8 \\ \therefore A - B &= 6x^4 - 16 \\ \therefore \text{Tiene 2 términos} \end{aligned}$$

Rpta. C

Resolución 13

$$\begin{aligned} P &= x^4 + 3x^2 + 5x \\ Q &= x^3 - 13x + 2 \\ R &= 2x^4 + x^2 + x^3 - 3x + 2 \\ (2P - R) + Q \\ \cancel{2x^4} + 6x^4 + \cancel{10x^2} - \cancel{2x^2} - x^2 - \cancel{x^3} + \cancel{3x^2} - 2 + \cancel{x^3} - \cancel{13x} + 2 \\ \boxed{5x^2} \end{aligned}$$

Rpta. C

Resolución 14

$$\begin{aligned} P &= x^4y^3 + 3x^3 + y^3 - x^2y^2 \\ Q &= 2x^2y^2 - 2x^3y^3 - y^3 + x^3 \\ R &= 4x^3 + x^3y^3 - x^2y^2 \\ \boxed{A + B + C = 8x^3} \end{aligned}$$

Rpta. D

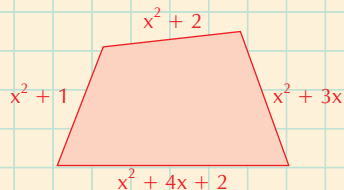
Resolución 15

$$\begin{aligned} A &= -4x^3y^2 - 7x^2y^3 + 2x^2y^2 \\ B &= 2x^2y^3 - 5y^2x^3 - 6x^2y^2 \\ C &= -5x^2y^2 - 5x^2y^3 - 9x^3y^2 \\ \therefore \sqrt{A + B - C} \\ \sqrt{-5x^2y^3 - 9x^3y^2 - 4x^2y^2 + 5x^2y^2 + 5x^2y^3 + 9x^3y^2} \\ \boxed{xy} \end{aligned}$$

Rpta. D

Aplica tus aprendizajes 6

Resolución 1



$$2p = x^2 + 1 + x^2 + 2 + x^2 + 3x + x^2 + 4x + 2$$

$$2p = 4x^2 + 7x + 5$$

Rpta. A

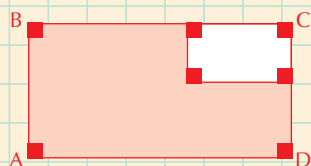
Resolución 2

$$\text{Gastó} = 4(2x + 3) + 5(x^2 - x + 1)$$

$$\text{Gastó} = S/. (5x^2 + 3x + 17)$$

Rpta. B

Resolución 3



$$\begin{aligned} AD &= BG + FE \\ AB &= GF + DE \end{aligned}$$

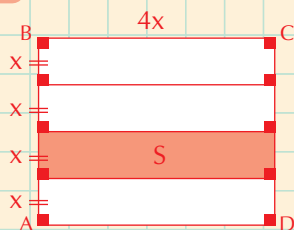
$$2p_s = AB + BG + FE + GF + ED + AD$$

$$2p_s = AB + AD + AB + AD$$

$$2p_s = 32x$$

Rpta. B

Resolución 4

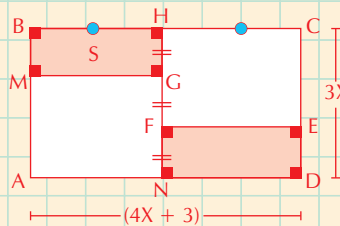


$$2p_s = x + x + 4x + 4x$$

$$2p_s = 10x$$

Rpta. C

Resolución 5



$$\cdot BH + FE = AD$$

$$\cdot MG + ND = AD$$

$$\cdot BM = HG$$

$$\cdot FN = ED$$

$$2p_s = BM + BH + HG + MG + FE + ED + FN + ND$$

$$2p_s = 2HG + AD + AD + 2FN$$

$$2p_s = 2x + 2(4x + 3) + 2x$$

$$2p_s = 6(2x + 1)$$

Rpta. D

Resolución 6

$$\Sigma \text{ Artistas} = ?$$

$$\Sigma_{\text{Artistas}} = 4(5x^2y) + 4(7x^2y) + 4(3x^2y)$$

$$\Sigma_{\text{Artistas}} = 20x^2y + 28x^2y + 12x^2y$$

$$\Sigma_{\text{Artistas}} = 60x^2y$$

Rpta. D

Resolución 7

$$2p_s \text{ CDAGFE} = ?$$

$$2p = y + 10 + y - x + x + x + 10 - x$$

$$2p = 2y + 20$$

$$2p = 2(y + 10)$$

Rpta. D

Resolución 8

$$2p = 2x + 2y + 2(3) + 2(12 - x)$$

$$2p = 2x + 2y + 6 + 24 - 2x$$

$$2p = 2y + 30$$

Rpta. E

Aplica tus aprendizajes 7

Resolución 1

$$(6x^4 - 3x^3 + 2x^2 + 5x)(x^2 + 3x - 1)$$

$$6x^6 + 15x^5 - 13x^4 + 14x^3 + 13x^2 - 5x$$

coef. mayor - coef. menor

$$15 - (-13) = \boxed{28}$$

Rpta. D

Resolución 2

$$(2x + 7)(3x - 5) + 3x(x - 2) - (9x^2 + 3x - 29) = mx + n$$

$$\cancel{6x^2} + 11x - 35 + \cancel{3x^2} - 6x - \cancel{9x^2} - 3x + 29 = mx + n$$

$$2x - 6 = mx + n$$

$$\therefore m + n = 2 - 6$$

$$\boxed{m + n = -4}$$

Rpta. B

Resolución 3

$$(3x + 2)(x - 4) - (2x - 4)(x + 6) + 8x^2 + 25x - 16 = ax^2 + bx$$

$$\cancel{3x^2} - 10x - \cancel{8} - \cancel{2x^2} - 8x + \cancel{24} + 8x^2 + 25x - \cancel{16} = ax^2 + bx$$

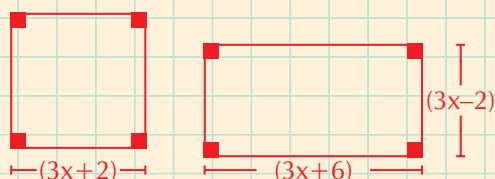
$$9x^2 + 7x = ax^2 + bx$$

$$\therefore a + b = 9 + 7$$

$$\boxed{a + b = 16}$$

Rpta. C

Resolución 4



$$A_{\square} - P = A_{\square}$$

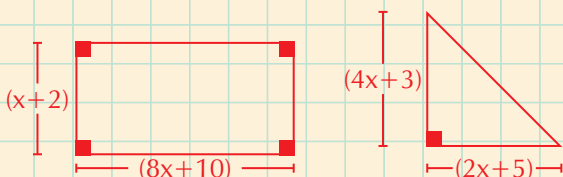
$$(3x + 2)(3x + 2) - P = (3x + 6)(3x - 2)$$

$$\cancel{9x^2} + \cancel{12x} + 4 - P = \cancel{9x^2} + \cancel{12x} - 12$$

$$\boxed{P = 16 u^2}$$

Rpta. E

Resolución 5



$$A_{\square} - P = 2A_{\triangle}$$

$$(x + 2)(8x + 10) - P = 2 \cdot \frac{1}{2} (4x + 3) \cdot (2x + 5)$$

$$\cancel{8x^2} + \cancel{26x} + 20 - P = \cancel{8x^2} + \cancel{26x} + 15$$

$$\boxed{P = 5 u^2}$$

Rpta. C

Resolución 6

$$P = (x + 1)^2 - (x + 2)^2 - (x + 3)^2 + (x + 4)^2$$

$$P = x^2 + 2x + 1 - x^2 - 4x - 4 - x^2 - 6x - 9 + x^2 + 8x + 16$$

$$\boxed{P = 4}$$

Rpta. B

Resolución 7

$$2b^2 + 2ab + \sqrt{(a^2 + b^2)^2 - (2ab)^2}$$

$$2b^2 + 2ab + \sqrt{a^4 + b^4 + 2a^2b^2 - 4a^2b^2}$$

$$2b^2 + 2ab + \sqrt{a^4 + b^4 - 2a^2b^2}$$

$$b^2 + 2ab + a^2 \quad \boxed{(a + b)^2}$$

Rpta. B

Resolución 8

$$E = (x + 1)(x - 1)(x^2 + 1) + 1$$

$$E = (x^2 - 1)(x^2 + 1) + 1$$

$$\boxed{E = x^4}$$

Rpta. D

Resolución 9

$$E = \frac{a(a+b)^2 \cdot (a-b)}{(a^2 - b^2)}$$

$$E = \frac{a(a+b)^2 \cancel{(a-b)}}{(a+b)\cancel{(a-b)}}$$

$$\boxed{E = a^2 + ab}$$

Rpta. E

Resolución 10

$$(m - 3n)^2 - 4n(2n - m) + 8 \quad ; \quad m - n = 8$$

$$m^2 + 9n^2 - 6mn - 8n^2 + 4mn + 8$$

$$m^2 - 2mn + n^2 + 8 = (m - n)^2 + 8 = \boxed{72}$$

Rpta. C

Resolución 11

$$(\sqrt{a + \sqrt{b}} \cdot \sqrt{a - \sqrt{b}})(\sqrt{a^2 - b}) + b$$

$$(\sqrt{(a + \sqrt{b})(a - \sqrt{b})})(\sqrt{a^2 - b}) + b$$

$$(\sqrt{a^2 - b})(\sqrt{a^2 - b}) + b$$

$$\cancel{a^2 - b} + b = \boxed{a^2}$$

Rpta. B

Resolución 12

$$R = \frac{(n + 3)^2 - (n - 3)^2}{6n}$$

$$R = \frac{12n}{6n} \rightarrow \boxed{R = 2}$$

Rpta. B

Resolución 13

$$P = \frac{(x + 2)(x - 2) + 9}{x^2 + 5}$$

$$P = \frac{x^2 - 4 + 9}{x^2 + 5} \rightarrow \boxed{P = 1}$$

Rpta. C

Resolución 14

$$\frac{(x + 1)^2 + (x - 1)^2 - 2}{x^2}$$

$$\frac{2(x^2 + 1) - 2}{x^2} = \boxed{2}$$

Rpta. E

Resolución 15

$$A = (x + y + 1)^2 - (x + y - 1)^2$$

$$A = (x + y + 1 + x + y - 1)(x + y + 1 - x - y + 1)$$

$$A = 4(x + y)$$

Rpta. A

Resolución 16

$$R = (x^2 - 7x + 11)^2 - (x - 2)(x - 3)(x - 4)(x - 5)$$

$$R = x^4 - 14x^3 + 71x^2 - 154x + 121 - x^4 + 14x^3 - 71x^2 + 154x - 120$$

$$R = 1$$

Rpta. C

Resolución 17

$$(3x + 2)^2 + P = (3x + 5)(3x + 7)$$

$$9x^2 + 12x + 4 + P = 9x^2 + 36x + 35$$

$$P = 24x + 31$$

Rpta. A

Resolución 18

$$(6x + 5)^2 - Q = (9x + 5)(4x - 3)$$

$$36x^2 + 60x + 25 - Q = 36x^2 - 7x - 15$$

$$Q = 67x + 40$$

Rpta. B

Resolución 19

$$A) 3(x + 2)(x - 1) = (x + 2)(3x - 3)$$

$$B) (2 + x)(3x - 3) = (x + 2)(3x - 3)$$

$$C) -(2 + x)(3 - 3x) = (x + 2)(3x - 3)$$

$$D) (2 + x)(3 - 3x) \neq (x + 2)(3x - 3)$$

$$E) 3x^2 + 3x - 6 = (x + 2)(3x - 3)$$

Rpta. D

Resolución 20

$$(a + b)x + (b + c)y - [(a - b)x - (b - c)y] - 2b(x + y)$$

$$ax + bx + by + cy - ax + bx + by - cy - 2bx - 2by$$

$$0$$

Rpta. C

Resolución 21

$$\{x(x + y) - x(x - y)\}[2(x^2 + y^2) - 3(x^2 - y^2)] + P = 2x^3y + 3xy^3$$

$$\{x^2 + xy - x^2 + xy\}[2x^2 + 2y^2 - 3x^2 + 3y^2] + P = 2x^3y + 3xy^3$$

$$2xy(-x^2 + 5y^2) + P = 2x^3y + 3xy^3$$

$$P = 4x^3y - 7xy^3$$

Rpta. A

Resolución 22

$$R = (ax + b)(x^2 - x + 1)$$

$$R = ax^3 - (a - b)x^2 + (a - b)x + b$$

$$R = 7x^3 - mx^2 + nx + 4$$

$$\therefore a + b + m + n = 17$$

Rpta. C

Resolución 23

$$T = (\sqrt[4]{3} + 1)(\sqrt{3} + 1)(\sqrt[4]{3} - 1)$$

$$T = (\sqrt{3} - 1)(\sqrt{3} + 1)$$

$$T = 2$$

Rpta. C

Resolución 24

$$P = \sqrt{2} \cdot [(\sqrt{2} - 1)^5 + 41]$$

$$P = \sqrt{2} \cdot [(\sqrt{2} - 1)^4(\sqrt{2} - 1) + 41]$$

$$P = \sqrt{2} \cdot [(17 - 12\sqrt{2})(\sqrt{2} - 1) + 41]$$

$$P = \sqrt{2} \cdot [29\sqrt{2} - 41 + 41] \Rightarrow P = 58$$

Rpta. C

Resolución 25

$$M = \sqrt[4]{(a - 1)(a^2 + a + 1)(a^3 + 1)(a^6 + 1) + 1}$$

$$M = \sqrt[4]{(a^3 - 1)(a^3 + 1)(a^6 + 1) + 1}$$

$$M = \sqrt[4]{a^{12} - 1 + 1} \Rightarrow M = a^3$$

Rpta. B

Resolución 26

$$(x + y + z)^3 - (x + y)^3 - 3(x + y + z)(x + y)z$$

$$(x + y)^3 + z^3 + 3(x + y)z^2 + 3(x + y)z^2 - (x + y)^3 - 3(x + y + z)(x + y)z$$

$$3(x + y)z(z + y + z) - 3(x + y + z)(x + y)z + z^3$$

Rpta. C

Resolución 27

$$M = \sqrt[4]{2(5 + 3)(5^2 + 3^2)(5^4 + 3^4) + 3^8}$$

$$M = \sqrt[4]{(5 - 3)(5 + 3)(5^2 + 3^2)(5^4 + 3^4) + 3^8}$$

$$M = \sqrt[4]{(5^4 - 3^4)(5^4 + 3^4) + 3^8}$$

$$M = \sqrt[4]{5^8 - 3^8 + 3^8} \Rightarrow M = 25$$

Rpta. E

Resolución 28

$$R = \sqrt[3]{(x + 3x)^2 - (3x^2 + 1)^2} - x^2$$

$$R = \sqrt[3]{x^2 + 6x^2 + 9x^2 - 9x^2 - 6x^2 - 1 - x^2}$$

$$R = \sqrt[3]{x^2 + 6x^2 + 9x^2 - 9x^2 - 6x^2 - 1 - x^2}$$

$$R = \sqrt[3]{-1} \Rightarrow R = -1$$

Rpta. C

Resolución 29

$$T = \sqrt{(x^2 + x - 7)^2 - (x - 1)(x + 2)(x - 3)(x + 4)}$$

$$T = \sqrt{(x^2 + x - 7)^2 - (x - 1)(x + 2)(x - 3)(x + 4)} \rightarrow \text{Si: } x^2 + x = a$$

$$T = \sqrt{(x^2 + x - 7)^2 - (x^2 + x - 2)(x^2 + x - 12)}$$

$$T = \sqrt{(a - 7)^2 - (a - 2)(a - 12)}$$

$$\sqrt{a^2 - 14a + 49 - (a^2 - 14a + 24)} \rightarrow \sqrt{25} \Rightarrow T = 5$$

Rpta. E

Resolución 30

$$E = \sqrt[12]{(x^3 - y^3)(x + y)(x^2 - xy + y^2)(x^6 + y^6) + y^{12}}$$

$$E = \sqrt[12]{(x^3 - y^3)(x^3 + y^3)(x^6 + y^6) + y^{12}}$$

$$E = \sqrt[12]{(x^6 - y^6)(x^6 + y^6) + y^{12}}$$

$$E = \sqrt[12]{x^{12} - y^{12} + y^{12}} = \sqrt[12]{x^{12}} = x$$

Pero $x = 3 - \sqrt{2}$ Entonces $E = 3 - \sqrt{2}$ Rpta. C

Aplica tus aprendizajes 8

Resolución 1

$$\begin{aligned} &2(3x + 2)(2x + 3) - (3x + 4)(4x + 3) \\ &2(6x^2 + 13x + 6) - (12x^2 + 25x + 12) \Rightarrow \boxed{x} \end{aligned}$$

Resolución 2

$$\begin{aligned} &(x^2 + x + 1)(x^2 - x + 1) \\ &x^4 - \cancel{x^3} + \cancel{x^2} + \cancel{x^3} - \cancel{x^2} + \cancel{x} + x^2 - \cancel{x} + 1 \\ &\quad \boxed{x^4 + x^2 + 1} \end{aligned}$$

Rpta. C

Resolución 3

$$\begin{aligned} &x^2 - (3x + 1)(3x + 2) + 2(2x + 1)^2 \\ &\cancel{x^2} - \cancel{9x^2} - 9x - 2 + \cancel{8x^2} + 8x + 2 \Rightarrow \boxed{-x} \end{aligned}$$

Rpta. B

Resolución 4

$$\begin{aligned} &(x + y + xy)(x - y) - x^2y + y^2(x + 1) \\ &\cancel{x^2} - \cancel{xy} + \cancel{xy} - \cancel{y^2} + \cancel{x^2y} - \cancel{xy^2} - \cancel{x^2y} + \cancel{xy^2} + \cancel{y^2} \Rightarrow \boxed{x^2} \end{aligned}$$

Rpta. C

Resolución 5

$$\begin{aligned} &\cdot A = (2x - 1)(3x + 2) \\ &A = 6x^2 + x - 2 \\ &\cdot B = (4x + 3)(x - 2) \\ &B = 4x^2 - 5x - 6 \\ &\therefore (A + B) \cdot A \\ &(10x^2 - 4x - 8)(6x^2 + x - 2) \\ &60x^4 + 10x^3 - 20x^2 - 24x^3 - 4x^2 + \cancel{8x} - 48x^2 - \cancel{8x} + 16 \\ &\quad \boxed{60x^4 - 14x^3 - 72x^2 + 16} \end{aligned}$$

Rpta. C

Resolución 6

$$\begin{aligned} &\cdot P = (x + 6)(2x - 3) \\ &P = 2x^2 + 9x - 18 \\ &\cdot Q = (3x - 1)(x + 4) \\ &Q = 3x^2 + 11x - 4 \\ &\cdot R = (x - 2)(x + 8) \\ &R = x^2 + 6x - 16 \end{aligned}$$

$$\therefore P + (Q - R)$$

$$2x^2 + 9x - 18 + 2x^2 + 5x - 12$$

$$\boxed{4x^2 + 14x - 6}$$

Rpta. B

Resolución 7

$$\begin{aligned} &(5x^3 + 4x^2 + 3x)(x + 2) \\ &5x^4 + 14x^3 + 11x^2 + 6x \end{aligned}$$

$$\text{Suma coef.} = 36$$

Rpta. C

Resolución 8

$$\begin{aligned} &\cdot A = (z + 1)^3 \\ &A = z^3 + 1 + 3z^2 + 3z \\ &\cdot B = (z - 1)^3 \\ &B = z^3 - 1 - 3z^2 + 3z \therefore \boxed{B - A = -6z^2 - 2} \end{aligned}$$

Rpta. D

Resolución 9

$$\begin{aligned} &(x - 1)^3 - x^3 + 1 \\ &\cancel{x^3} - \cancel{3x^2} + 3x - \cancel{x^3} + 1 \Rightarrow \boxed{3x(1 - x)} \end{aligned}$$

Rpta. D

Resolución 10

$$\begin{aligned} &3 - (x^3 + \sqrt{3})(\sqrt{3} - x^3) \\ &3 + (x^3 + \sqrt{3})(x^3 - \sqrt{3}) \\ &3 + x^6 - 3 \Rightarrow \boxed{x^6} \end{aligned}$$

Rpta. E

Resolución 11

$$\begin{aligned} &E = (\sqrt{3} + \sqrt{2})^2 - (\sqrt{3} - \sqrt{2})^2 \\ &E = \cancel{3} + 2\sqrt{6} - \cancel{3} + 2\sqrt{6} \\ &E = 4\sqrt{6} \therefore \boxed{E^2 = 96} \end{aligned}$$

Rpta. E

Resolución 12

$$\begin{aligned} &\left(\frac{3 - \sqrt{3}}{2}\right)^2 - 3\left[\frac{3 - \sqrt{3}}{2}\right] - 1 \\ &\frac{22 - 6\sqrt{3}}{4} - \frac{9 - 3\sqrt{3}}{2} - 1 \\ &\frac{22 - 6\sqrt{3} - 18 + 6\sqrt{3} - 4}{4} \Rightarrow \boxed{0} \end{aligned}$$

Rpta. A

Resolución 13

$$\begin{aligned} &A) (a + b)^2 = (a + b)(a + b) \quad \dots \quad V \\ &B) a^3 - b^3 = (a - b)(a^2 + ab + b^2) \quad \dots \quad V \\ &C) a^2 + b^2 = (a + b)(a + b) \quad \dots \quad F \\ &D) a^2 - b^2 = (a + b)(a - b) \quad \dots \quad V \\ &E) a^3 + b^3 = (a + b)(a^2 - ab + b^2) \quad \dots \quad V \end{aligned}$$

Rpta. C

Resolución 14

$$P = (x+1)(x^2-x+1) - (x-1)(x^2+x+1)$$

$$P = x^3 + 1 - x^3 + 1$$

$$P = 2$$

Rpta. B

Resolución 15

$$P = x^2 - x + 2$$

$$Q = 3x^2 - x - 1$$

$$R = 2x^2 + 2x - 3$$

$$\therefore S = P(Q + R)$$

$$S = (x^2 - x + 2)(5x^2 + x - 4)$$

$$S = 5x^4 - 4x^3 + 5x^2 + 6x - 8$$

Rpta. B

Resolución 16

$$(x^2 + x + 1)(x^2 - x + 1)$$

$$x^4 - \cancel{x^2} + \cancel{x^2} + x^3 - \cancel{x^2} + x + x^2 - \cancel{x} + 1$$

$$x^4 + x^2 + 1$$

Rpta. C

Resolución 17

$$A = 8x^3y^2 + 6x^2y^2 + 3x^2y^3$$

$$B = 4y^2x^2 + 5x^3y^2 + 2x^2y^3$$

$$\Rightarrow [2A - 3B]^2$$

$$[16x^3y^2 + 12x^2y^2 - 6x^2y^3 - 12x^2y^2 - 15x^3y^2 - 6x^2y^3]$$

$$x^6y^4$$

Rpta. A

Resolución 18

$$A = (2x^2 - 3)(3x^2 - 2x + 5)$$

$$A = 6x^4 - 4x^3 + x^2 + 6x - 15$$

$$B = (3x^2 - 2)(2x^2 + 3x - 5)$$

$$B = 6x^4 + 9x^3 - 19x^2 - 6x + 10$$

$$C = 13x^3 - 20x^2 - 11x + 25$$

$$\Rightarrow A - B + C$$

$$-13x^3 + 20x^2 + 12x - 25 + 13x^3 - 20x^2 - 11x + 25$$

$$x$$

Rpta. A

Aplica tus aprendizajes 9

Resolución 1

$$(a+b)^2 = 3^2 ; ab = 4$$

$$a^2 + b^2 + 2ab = 9$$

$$a^2 + b^2 = 1$$

Rpta. B

Resolución 2

$$x^{-1} + y^{-1} = a ; xy = b$$

$$\frac{1}{x} + \frac{1}{y} = a$$

$$(y+x)^2 = (ab)^2$$

$$x^2 + y^2 + 2xy = a^2b^2$$

$$x^2 + y^2 = a^2b^2 - 2b$$

Rpta. B

Resolución 3

$$(a+b)^3 = 3^3 ; ab = 3$$

$$a^3 + b^3 + 3a^2 + 3ab^2 = 27$$

$$a^3 + b^3 + 3ab(a+b) = 27$$

$$a^3 + b^3 = 0$$

Rpta. A

Resolución 4

$$\left(n + \frac{1}{n}\right)^2 = 3$$

$$n^2 + \frac{1}{n^2} + 2 = 3$$

$$\left(n + \frac{1}{n}\right)\left(n^2 + \frac{1}{n^2}\right) = 1\left(n + \frac{1}{n}\right)$$

$$n^3 + \frac{1}{n^3} + n + \frac{1}{n} = n + \frac{1}{n}$$

$$n^3 + \frac{1}{n^3} = 0$$

Rpta. B

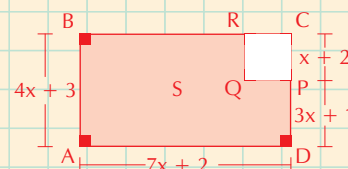
Resolución 5

$$E = \frac{1}{x-1} - \frac{1}{x+1}$$

$$E = \frac{x+1-x+1}{x^2-1} \Rightarrow E = \frac{2}{5-1} \quad E = \frac{1}{2}$$

Rpta. D

Resolución 6



$$A_S = A_{\square} - A_{\square}$$

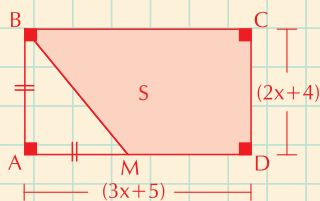
$$A_S = (4x+3)(7x+2) - (x+2)^2$$

$$A_S = 28x^2 + 29x + 6 - x^2 - 4x - 4$$

$$A_S = 27x^2 + 25x + 2$$

Rpta. A

Resolución 7



$$A_S = A_{\square} - A_{\triangle}$$

$$A_S = (3x + 5)(2x + 4) - (x + 2)(2x + 4)$$

$$A_S = 6x^2 + 22x + 20 - 2x^2 - 8x - 8$$

$$A_S = 4x^2 + 14x + 12$$

Rpta. C

Resolución 8

$$E = (mx + m)(x^2 + x + 1)$$

$$E = mx^3 + (m + n)x^2 + (m + n)x + n$$

$$E = 4x^3 + Ax^2 + Bx + 5$$

$$\therefore A + B + m + n = 27$$

Rpta. B

Resolución 9

$$x^2 + y^2 = 26 ; xy = 5$$

$$(x - y)^2 + 2xy = 26$$

$$x - y = 4$$

$$\frac{x - y}{2} = 2$$

Rpta. E

Resolución 10

$$(x + y)^2 = 5^2 \wedge x^2 + y^2 = 11$$

$$x^3 + y^3 + 2xy = 25$$

$$xy = 7$$

$$(x + y)(x^2 + y^2) = 5 \cdot 11$$

$$x^3 + y^3 + xy(x + y) = 55$$

$$x^3 + y^3 = 20$$

Rpta. D

Resolución 11

$$(x + y)^3 = 2^3 ; xy = 3$$

$$x^3 + y^3 + 3xy(x + y) = 8$$

$$x^3 + y^3 = -10$$

$$(x + y)^2 = 2^2$$

$$x^2 + y^2 = -2$$

$$\therefore R = \frac{x^3 + y^3}{x^2 + y^2}$$

$$R = 5$$

Rpta. D

Resolución 12

$$(x + y)^2 + (x - y)^2$$

$$2(x^2 + y^2)$$

Rpta. E

Resolución 13

$$(x + y)^2 = (2\sqrt{6})^2 ; x \cdot y = 4$$

$$x^2 + y^2 + 2xy - 4xy = 24 - 4xy$$

$$(x - y)^2 = 8 \quad \boxed{x - y = \sqrt{8}}$$

Rpta. E

Resolución 14

$$\left(x + \frac{1}{x}\right)^2 = 3^2 \Rightarrow x^2 + \frac{1}{x^2} + 2 - 4 = 9 - 4$$

$$\left(x - \frac{1}{x}\right) = 5 \Rightarrow x - \frac{1}{x} = \sqrt{5}$$

$$\therefore \left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right) = 3 \cdot \sqrt{5}$$

$$x^2 - \frac{1}{x^2} = 3\sqrt{5}$$

Rpta. A

Resolución 15

$$R = \frac{(x + y)^2 - (x - y)^2}{(x + y)^2 + (x - y)^2} ; x^2 + y^2 = 3xy$$

$$R = \frac{4xy}{2(x^2 + y^2)} \Rightarrow \boxed{R = \frac{2}{3}}$$

Rpta. D

Resolución 16

$$\text{Dato: } x^4 + y^6 = 4$$

$$R = \frac{x^4 - 2x^2y + y + x^4 + 2x^2y^3 + y^6}{2x^2}$$

$$R = \frac{2(x^4 + y^6)}{2x^2} = \frac{2 \cdot 4}{4} = 2$$

$$\therefore \boxed{R = 2}$$

Rpta. B

Resolución 17

$$\bullet x + \frac{2}{x} = 1$$

$$x^2 - x = -2$$

$$\bullet R = (x - 3)(x + 2)(x - 4)(x + 3)$$

$$R = (\underbrace{x^2 - x - 6})(\underbrace{x^2 - x - 12})$$

$$R = (-2 - 6)(-2 - 12) \therefore \boxed{R = 112}$$

Rpta. C

Resolución 18

$$P = \sqrt{2}[(\sqrt{2} - 1)^5 + 41]$$

$$P = \sqrt{2}[(\sqrt{2} - 1)^4(\sqrt{2} - 1) + 41]$$

$$P = \sqrt{2}[(17 - 12\sqrt{2})(\sqrt{2} - 1) + 41]$$

$$P = \sqrt{2}[29\sqrt{2} - 41 + 41]$$

$$P = \sqrt{2}[29\sqrt{2}] \therefore \boxed{P = 58}$$

Rpta. C

Aplica tus aprendizajes 10

Resolución 1

$$(x^3 - 3x^2 + 2x + 4) \div (x^2 + x - 2)$$

1	1	-3	2	4
-1		-1	2	
2			4	-8
	1	-4	8	-4

$$\therefore \text{suma coef. residuo} = 4$$

Rpta. D

Resolución 2

$$(x^3 + 3x^2 - x - 3) \div (x^2 + 2x - 3)$$

1	1	3	-1	-3
-2		-2	3	
3			-2	3
	1	1	0	0

$$\therefore \text{cociente: } x + 1$$

Rpta. A

Resolución 3

$$(x^5 - 6x^4 - 2x^3 - x + 1) \div (x^3 - 3x^2 + 1)$$

1	1	-6	-2	0	-1	1
3		3	0	-1		
0			-9	0	3	
-1				-33	0	11
	1	-3	-11	-34	2	12

$$\text{cociente: } x^2 - 3x - 11$$

$$\text{Residuo: } -34x^2 + 2x + 12$$

Rpta. C

Resolución 4

$$\frac{(4x^2 + 6x + 1)^2 - x^2}{4x^2 + 7x + 1}$$

$$\frac{(4x^2 + \cancel{6x} + 1 + x)(4x^2 + 6x + 1 - x)}{4x^2 + \cancel{7x} + 1}$$

$$\boxed{4x^2 + 5x + 1}$$

Rpta. E

Resolución 5

$$(x^3 - 6x^2 + 5x + 10) \div (x^2 - 4x + 2)$$

1	1	-6	5	10
4		4	-2	
-2			-8	4
	1	-2	-5	14

$$\text{Residuo: } -5x + 14$$

Rpta. E

Resolución 6

$$\frac{x^3 + 3x^2y - 4y^3}{x - y}$$

$x^3 + 3x^2y + 0xy^2 - 4y^3$	$x - y$
$x^3 + x^2y$	$x^2 + 4xy + 4y^2$
$4x^2y + 0xy^2$	
$-4x^2y + 4xy^2$	
$4xy^2 - 4y^3$	
$-4xy^2 + 4y^3$	

$$\text{cociente: } (x + 2y)^2$$

Rpta. B

Resolución 7

$$\frac{x^{20} - y^n}{x^n + y^5} \Rightarrow \frac{20}{n} = \frac{n}{5}$$

$$n = 10$$

$$\frac{(x^{10})^2 - (y^5)^2}{x^{10} + y^5} = \frac{(x^{10} - y^5)(x^{10} + y^5)}{(x^{10} + y^5)}$$

$$= x^{10} - y^5 \rightarrow 2 \text{ términos}$$

Rpta. A

Resolución 8

$$\frac{4x^6 + 2x + a}{x + 1}$$

$$\text{Teorema del resto: } x + 1 = 0$$

$$x = -1$$

$$4(-1)^6 + 2(-1) + a = 7$$

$$\boxed{a = 5}$$

Rpta. C

Resolución 9

$$\frac{x^5 - y^5}{x - y} ; k = 3 \quad \wedge \quad n = 5$$

$$t_k = \pm x^{n-k} y^{k-1}$$

$$\boxed{t_3 = x^2 y^2}$$

Rpta. A

Resolución 10

$$\frac{t^8 - 1}{t + 1}; k = 5 \quad \wedge \quad n = 8$$

$$t_k = \pm x^{n-k} y^{k-1}$$

$$t_5 = t^3 \cdot 1^4$$

$$t_5 = t^3$$

Rpta. D

Resolución 11

$$\frac{16x^4 - 81}{2x + 3}$$

$$\frac{(2x)^4 - 3^4}{2x + 3}; n = 4 \quad \wedge \quad k = 2$$

$$t_2 = -(2x)^2 \cdot (3)$$

$$t_2 = -12x^2$$

Rpta. B

Resolución 12

$$\frac{6x^4 - 4x^3 + x^2 + 10x + 2}{3x + 1}$$

$$\div 3 \Rightarrow \left(2x^4 - \frac{4}{3}x^3 + \frac{1}{3}x^2 + \frac{10}{3}x + \frac{2}{3}\right) \div \left(x + \frac{1}{3}\right)$$

	2	$-\frac{4}{3}$	$\frac{1}{3}$	$\frac{10}{3}$	$\frac{2}{3}$
$-\frac{1}{3}$		$-\frac{2}{3}$	$\frac{2}{3}$	$-\frac{1}{3}$	-1
	2	-2	1	3	$-\frac{1}{3}$

$$\text{cociente: } 2x^3 - 2x^2 + x + 3$$

Rpta. C

Resolución 13

$$\frac{12x^4 - 14x^3 + 15x^2 - 6x + 4}{4x^2 - 2x + 1}$$

4	12	-14	15	-6	4
2		6	-3		
			-4	2	
-1				4	-2
	3	-2	2	0	2

$$Q(x): 3x^2 - 2x + 2$$

$$R(x): 2$$

Rpta. A

Resolución 14

$$\frac{4x^4 + 13x^3 + 13x^2 + 8x + 5}{4x^2 + x + 2}$$

4	4	13	13	8	5
-1		-1	-2		
			-3	-6	
-2				-2	-1
	1	3	2	0	1

$$Q(x): x^2 + 3x + 2$$

Rpta. A

Resolución 15

$$\frac{2x^4 + 7x^3 + 13x^2 + 12x + 5}{2x^2 + 3x + 1}$$

2	2	7	13	12	5
-3		-3	-1		
			-6	-2	
-1				-9	-3
	1	2	3	1	2

$$Q(x): x^2 + 2x + 3$$

Rpta. C

Resolución 16

$$\frac{5x^5 - x^4 + 6x^3 - 7x + 3}{5x^2 - 6x + 2}$$

5	5	-1	6	0	-7	3
		6	-2			
6			6	-2		
				12	-4	
-2					12	-4
	1	1	2	2	1	-1

$$\therefore \text{Suma coef. } Q(x) = 6$$

Rpta. A

Resolución 17

$$\frac{x^4 + 2x^2 + 3x + 4}{x^2 + x + 2}$$

1	1	0	2	3	4
-1		-1	-2		
			1	2	
-2				-1	-2
	1	-1	1	4	2

$$R(x): 4x + 2$$

Rpta. B

Resolución 18

$$\frac{2x^4 + 3x^3 + 4x + 5}{x^2 + x + 2}$$

1	2	3	0	4	5
		-1	-2		
-1			1	-2	
-2				5	10
	2	1	-5	7	15

$$R(x) = 7x + 15$$

Rpta. A

Resolución 19

$$\frac{2x^4 + 3x^3 + 5x^2 + 8x + 6}{2x + 1}$$

$$\div 2 \Rightarrow \left(x^4 + \frac{3}{2}x^3 + \frac{5}{2}x^2 + 4x + 3\right) \div \left(x + \frac{1}{2}\right)$$

	1	$\frac{3}{2}$	$\frac{5}{2}$	4	3
$-\frac{1}{2}$		$-\frac{1}{2}$	$-\frac{1}{2}$	-1	$-\frac{3}{2}$
	1	1	2	3	$\frac{3}{2}$

$$\therefore \text{Suma coef. } Q(x) = 7$$

Rpta. B

Resolución 20

$$(6x^3 - 5x^2 - 4x + 4) \div (x - 1)$$

	6	-5	-4	4
1		6	1	-3
	6	1	-3	1

$$\text{Residuo} = 1$$

Rpta. A

Resolución 21

$$\frac{x^4 + 2x^2 + 5}{x^2 + 1}$$

$$\text{Teorema del resto: } x^2 + 1 = 0$$

$$x^2 = -1$$

$$\Rightarrow \text{Resto} = (x^2)^2 + 2x^2 + 5$$

$$\text{Resto} = (-1)^2 + 2(-1) + 5$$

$$\text{Residuo} = 4$$

Rpta. A

Resolución 22

$$\frac{3x^3 - 2x^2 - 15x - 18}{x - 3}$$

	3	-2	-15	-18
3		9	21	18
	3	7	6	0

$$Q(x) - 3x^2 = 3x^2 + 7x + 6 - 3x^2$$

$$Q(x) - 3x^2 = 7x + 6$$

Rpta. C

Resolución 23

$$\frac{x^{3n} + 3x^n + 2x^{4n} + 12}{x^n + 1}$$

$$\text{Teorema del resto: } x^n + 1 = 0 \Rightarrow x^n = -1$$

$$\Rightarrow \text{Resto} = (x^n)^3 + 3x^n + 2(x^n)^4 + 12$$

$$= (-1)^3 + 3(-1) + 2(-1)^4 + 12$$

$$\text{Resto} = 10$$

Rpta. D

Resolución 24

$$\frac{x^{20} + y^{15}}{x^4 + y^3} = \frac{(x^4)^5 + (y^3)^5}{x^4 + y^3}$$

$$\therefore x^{16} - x^{12}y^3 + x^8y^6 - x^4y^9 + y^{12}$$

Rpta. B

Resolución 25

$$(2x^4 + 7) \div (3x^3 + 9x + 15)$$

3	2	0	0	0	7
0		0	-6	-10	
-9			0	0	0
-15					
	$\frac{2}{3}$	0	-6	-10	7

$$R(x) = -6x^2 - 10x + 7$$

Rpta. E

Resolución 26

$$\frac{P(x)}{Q(x)} = \frac{2x^3 + 3x^2 - nx + m}{2x^2 - x - 1}$$

2	2	3	-n	m
1		1	1	
1			2	2
	1	2	0	0

$$3 - n = 0$$

$$n = 3$$

 $\wedge$

$$m + 2 = 0$$

$$m = -2$$

$$\therefore m + n = 1$$

Rpta. E

Resolución 27

$$(4x^5 - 10x^3 + 22x^2 - 1) \div (2x^2 + 4x - 1)$$

2	4	0	-10	22	0	-1
		-8	2			
-4			16	-4		
				-16	4	
1					-4	1
	2	-4	4	1	0	0

$$Q(x) = 2x^3 - 4x^2 + 4x + 1$$

menor coef. = -4

Rpta. B

Resolución 28

$$\frac{10x^4 + 6x^3 - 37x^2 + 33x - 9}{5x^2 - 7x + 3}$$

5	10	6	-37	33	-9
7		14	-6		
			28	-12	
3				-21	9
	2	4	-3	0	0

$$Q(x) = 2x^2 + 4x - 3$$

término independiente. = -3

Rpta. E

Resolución 29

$$\frac{x^3}{x^2 + x + 1}$$

$$x^3 = \underbrace{(x-1)(x^2 + x + 1)}_{Q(x)} + \underbrace{1}_{R(x)}$$

R(x) = 1

Rpta. C

Resolución 30

$$\frac{x^3}{x^2 + x + 1}$$

$$x^4 = \underbrace{(x+1)(x^3 - x^2 - x - 1)}_{Q(x)} + \underbrace{2x^2 + 2x + 1}_{R(x)}$$

R(x) = $2x^2 + 2x + 1$

Rpta. A

Aplica tus aprendizajes 11

Resolución 1

$$(64x^4 - 36x^3 + 8x) \div (4x - 1)$$

Dividimos $\div 4$

$$(16x^4 - 9x^2 + 2x) \div (x - 1/4)$$

	16	0	-9	2	0
1/4		4	1	-2	0
	16	4	-8	0	0

cociente = $16x^3 + 4x^2 - 8x$

Rpta. C

Resolución 2

$$(x^4 - 2x^2 - 6) \div (x - 3)$$

	1	0	-2	0	-6
-3		-3	9	-21	63
	1	-3	7	-21	57

Residuo: 57

Rpta. D

Resolución 3

$$(6x^3 - 5x^2 - 4x + 4) \div (x - 1)$$

Teorema del resto: $x - 1 = 0$

$$x = 1$$

$$6(1)^3 - 5(1)^2 - 4(1) + 4$$

Resto = 1

Rpta. A

Resolución 4

$$(x^4 - 2x^3 + 4x^2 - x + 1) \div (x - 2)$$

Teorema del resto: $x - 2 = 0$

$$x = 2$$

$$2^4 - 2(2)^3 + 4(2)^2 - 2 + 1$$

Resto = 15

Rpta. C

Resolución 5

$$(2x^4 - 8x^2 + 7x - 11) \div (x - 2)$$

Teorema del resto: $x - 2 = 0$

$$x = 2$$

$$2(2)^4 - 8(2)^2 + 7(2) - 11 = 3$$

Resto = 3

Rpta. A

Resolución 6

$$\frac{(x-3)^8 + 16}{x-4}$$

Teorema del resto: $x - 4 = 0$

$$x = 4$$

$$\therefore (4-3)^8 + 16 = 17$$

Resto = 17

Rpta. A

Resolución 7

$$\frac{x^4 + 3x^3 + 2x^2 + 5x + 4}{x + 2}$$

Teorema del resto: $x + 2 = 0$

$$x = -2$$

Entonces:

$$\text{Resto} = (-2)^4 + 3(-2)^3 + 2(-2)^2 + 5(-2) + 4$$

$$\boxed{\text{Resto} = -6}$$

Rpta. D

Resolución 8

$$\frac{2x^7 - 4x^6 + 2x + 3}{x - 2}$$

Teorema del resto: $x - 2 = 0$

$$x = 2$$

Entonces:

$$2(2)^7 - 4(2)^6 + 2(2) + 3 \quad \boxed{\text{Resto} = 7}$$

Rpta. C

Resolución 9

$$\frac{x^9 + x^8 + x^2 + x + 1}{x - 1}$$

Teorema del resto: $x - 1 = 0$

$$x = 1$$

$$\text{Resto} = (1)^9 + (1)^8 + (1)^2 + 1 + 1$$

$$\boxed{\text{Resto} = 5}$$

Rpta. D

Resolución 10

1	1	-2	-6	m	n	p
3		3	1	-3		
1			3	+1	-3	
-3				-6	-2	6
	1	1	-2	0	0	0

$$\text{i) } p = -6$$

$$\text{ii) } n - 3 - 2 = 0 \quad \rightarrow \quad n = 5$$

$$\text{iii) } m - 3 + 1 - 6 = 0 \quad \rightarrow \quad m = 8$$

$$\therefore \boxed{mnp = 8 \times 5 \times -6 = -240}$$

Rpta. D

Resolución 11

	2	3	-5	(10)	6
-3	↓	(-6)	9	-12	6
	2	-3	(4)	-2	12

$$\therefore \text{ suma valores: } -6 + 4 + 10 = 8$$

Rpta. C

Resolución 12

2	6	5	0	2m	-3n
-1		-3	-9		
-3			-1	-3	
	3	1	-5	5	15
				0	0

$$\text{i) } 2m - 3 + 5 = 0 \quad 2m + 2 = 0 \quad \boxed{m = -1}$$

$$\text{ii) } -3n = 15 \quad \boxed{n = -5}$$

$$\text{iii) } \therefore (m + n)^2 = (-1 - 5)^2 = (4)^2$$

$$\boxed{(m + n)^2 = 16}$$

Rpta. B

Aplica tus aprendizajes 12

Resolución 1

$$(4x^5 - 2x^3 + k - 2) \div (x - 2)$$

$$\text{Por teorema del resto: } \begin{aligned} x - 2 &= 0 \\ x &= 2 \end{aligned}$$

Divisible por $x - 2$

$$\therefore 4(2)^5 - 2(2)^3 + 2k - 2 = 0$$

$$\boxed{k = -55}$$

Rpta. E

Resolución 2

$$(6x^3 - kx^2 + x - 1) \div (x^2 - 3)$$

$$\text{Por teorema del resto: } \begin{aligned} x^2 - 3 &= 0 \\ x^2 &= 3 \end{aligned}$$

Entonces:

$$6x^2 \cdot x - kx^2 + x - 1$$

$$6 \cdot 3 \cdot x - 3k + x - 1 = 19x - 7$$

$$19x - (3k + 1) = 19x - 7$$

$$3k + 1 = 7$$

$$\boxed{k = 2}$$

Rpta. D

Resolución 3

$$(5x^3 - 2x^2 + ax - b) \div (x^2 - 3)$$

$$\text{Teorema del resto: } \begin{aligned} x^2 + 1 &= 0 \\ x^2 &= 2 \end{aligned}$$

Entonces:

$$5(-1)x - 2(-1) + ax - b = 0$$

$$(a - 5)x + (2 - b) = 0$$

$$\boxed{a = 5}$$

 $\wedge$

$$\boxed{b = 2}$$

Rpta. A

Resolución 4

$$\frac{9a^2 - 1}{3a + 1} + \frac{36 - 9a^2}{6 + 3a}$$

$$\frac{(3a+1)(3a-1)}{(3a+1)} + \frac{(6+3a)(6-3a)}{(6+3a)}$$

$$\boxed{5}$$

Rpta. E

Resolución 5

$$\frac{y^3 - 1}{y - 1} - \frac{y^2 - 4}{y - 2}$$

$$\frac{(y-1)(y^2+y+1)}{(y-1)} - \frac{(y+2)(y-2)}{(y-2)}$$

$$\boxed{y^2 - 1}$$

Rpta. C

Resolución 6

$$\frac{2x^3 + nx^2 - 4x + n}{2x + n}$$

Teorema del resto: $2x + n = 0$

$$x = -\frac{n}{2}$$

$$\Rightarrow 2\left(-\frac{n}{2}\right)^3 + n\left(-\frac{n}{2}\right)^2 - 4\left(-\frac{n}{2}\right) + n = -15$$

$$-\frac{n^3}{4} + \frac{n^3}{4} + 2n + n = -15$$

$$\boxed{n = -5}$$

Rpta. A

Resolución 7

$$\frac{3x^4 - 2x^3 + ax^2 - x - 2}{x - 2}$$

Por teorema del resto: $x - 2 = 0$
 $x = 2$

$$3(2)^4 - 2(2)^3 + a(2)^2 - 2 - 2 = 0$$

$$\boxed{a = -7}$$

Rpta. B

Resolución 8

$$\frac{(b - 2a^2)x^3 + 2a^2x + x^5 + ax^4 + (a - ab)x^2 + 5 - 3a^3}{x - a}$$

Teorema del resto: $x - a = 0$
 $x = a$

$$\therefore (b - 2a^2) \cdot a^3 + 2a^2 \cdot a + a^5 + a \cdot a^4 + (a - ab)a^2 + 5 - 3a^3$$

$$a^3b - 2a^5 + 2a^3 + a^5 + a^5 + a^5 - a^3b + 5 - 3a^3$$

$$\boxed{\text{Resto} = 5}$$

Rpta. D

Resolución 9

$$\frac{x^{n+1} - y^{3n-4}}{x - y^2}$$

$$\frac{n+1}{1} = \frac{3n-4}{2}$$

$$2n + 2 = 3n - 4$$

$$\boxed{n = 6}$$

Rpta. A

Resolución 10

$$\frac{x^4 + 2x^3 + 5x^2 + Ax + B}{x^2 + x - 2}$$

1	1	2	5	A	B
-1		-1	2		
			-1	2	
2				-6	12
	1	1	6	3	14

$$A - 4 = 3 \quad \wedge \quad B + 12 = 14$$

$$A = 7 \quad \quad \quad B = 2$$

$$\therefore \boxed{A + B = 9}$$

Rpta. D

Resolución 11

$$\frac{2x^4 + 3x^3 + x^2 + ax + b}{x^2 + 2x + 3}$$

1	2	3	1	a	b
-2		-4	-6		
			2	3	
-3				6	9
	2	-1	-3	0	0

$$a + 9 = 0 \quad \wedge \quad b + 9 = 0$$

$$a = -9 \quad \quad \quad b = -9$$

$$\therefore \boxed{a/b = 1}$$

Rpta. A

Resolución 12

$$\frac{x^4 + 4x^3 + x^2 + mx + n}{x^2 + 3x + 1}$$

1	1	4	1	m	n
		-3	-1		
-3			-3	-1	
-1				9	3
	1	1	-3	0	0

$$m + 8 = 0 \quad \wedge \quad n + 3 = 0$$

$$m = -8 \quad \quad \quad n = -3$$

$$\therefore \boxed{m \cdot n = 24}$$

Rpta. C

Resolución 13

$$\frac{x^4 + 3x^3 + 2x^2 + 3x + m}{x^2 + 3x + 1}$$

1	1	3	2	3	m
-3		-3	-1		
			0	0	
-1				-3	-1
	1	0	1	0	0

$$m - 1 = 0$$

$$m = 1$$

Rpta. D

Resolución 14

$$\frac{x^{3n+8} - y^{2n-1}}{x^2 - y}$$

$$\frac{3n+8}{2} = 2n-1$$

$$n = 10$$

$$\therefore \frac{(x^2)^{19} - y^{19}}{x^2 - y}$$

$$n^\circ \text{ términos} = 19$$

Rpta. D

Resolución 15

$$\frac{x^{4n-5} + y^{2n}}{x^3 + y^2}$$

$$\frac{4n-5}{3} = \frac{2n}{2}$$

$$n = 5$$

$$\therefore \frac{(x^3)^5 + (y^2)^5}{x^3 + y^2}$$

$$n^\circ \text{ términos} = 5$$

Rpta. B

Aplica tus aprendizajes 13

5

$$a) \frac{(a-b)(\cancel{a^2+ab+b^2})}{\cancel{a^2+ab+b^2}} = a-b$$

Rpta. A

$$b) \frac{(x+y)(\cancel{x^2-xy+y^2})}{\cancel{x^2-xy+y^2}} = x+y$$

Rpta. B

$$c) \frac{ax+ay-bx-by}{(a+b)(a-b)} = \frac{a(x+y)-b(x+y)}{(a+b)(a-b)}$$

$$\frac{(x+y)(\cancel{a-b})}{(a+b)(\cancel{a-b})} = \frac{x+y}{a+b}$$

Rpta. C

$$d) \frac{m^3 + m^2 + mn^2 + n^2}{m^3 + m^2 - mn^2 - n^2} = \frac{m^2(m+1) + n^2(m+1)}{m^2(m+1) - n^2(m+1)}$$

$$\frac{(\cancel{m+1})(m^2+n^2)}{(\cancel{m+1})(m^2-n^2)} = \frac{m^2+n^2}{m^2-n^2}$$

Rpta. A

$$e) \frac{x^3-8}{x^2y+2xy+4y} = \frac{(x-2)(\cancel{x^2+1x+4})}{y(\cancel{x^2+1x+4})}$$

$$\frac{x-2}{y}$$

Rpta. C

$$f) \frac{a^3+27}{a^2b^2-3ab+9b^2} = \frac{(a+3)(\cancel{a^2-3a+9})}{b^2(\cancel{a^2-3a+9})}$$

$$\frac{a+3}{b^2}$$

Rpta. A

$$g) \frac{(x+1)(x^2-x+1)}{(x-1)-x(x-1)+x-1} = \frac{(x+1)(\cancel{x^2-x+1})}{(x-1)(\cancel{x^2-x+1})}$$

$$\frac{x+1}{x-1}$$

Rpta. B

$$h) \frac{xy(x^2-y^2)}{xy(x+y)} = \frac{\cancel{xy}(x+y)(x-y)}{\cancel{xy}(x+y)} = x-y$$

Rpta. D

6 $3x^2 - 3x^4 + y^2 - x^2y^2 = (3x^2 + y^2)(1 + x)(1 - x)$

Rpta. E

7 $(x-1)(x-2)(x-3)(x-4) - 15$
 $(x-1)(x-4)(x-2)(x-3) - 15$
 $(\underbrace{x^2 - 5x + 4}_a)(\underbrace{x^2 - 5x + 6}_a) - 15$
 $(a+4)(a+6) - 15$
 $a^2 + 10a + 24 - 15$
 $a^2 + 10a + 9$
 $(a+9)(a+1)$
 $(x^2 - 5x + 9)(x^2 - 5x + 1)$

8 $9x^4 + 9x^2y^2 + 4y^2$
 $(3x^2 + 4y^2)(3x^2 + y^2)$
 3×4
 12

9 $(ax + a)(ax - b)$

10 I) $(y+7)(y-2)$
 II) $(y-2)(y+1)$
 III) $(y+5)(y-2)$
 Factor común: $(y-2)$

11 $2my - 2ny - mx + nx$
 $-2y(-m+n)(+x(-m+n))$
 $(-2y+x)(-m+n)$
 $\therefore (x-2y)(n-m)$

12 $y^3 - 5y^2 - 2y + 10$
 $y^3 - 2y - 5y^2 + 10$
 $y(y^2 - 2) - 5(y^2 - 2)$
 $(y^2 - 2)(y - 5)$
 Suma = $y^2 + y - 7$

13 $x^2(x+1) + (1+x)$
 $(x+1)(x^2+1)$

Aplica tus aprendizajes 14

1 I. $x^2 + 5x - 14 = (x+7)(x-2)$
 II. $x^2 - 2 = (x-2)(x+1)$
 III. $x^2 + 3x - 10 = (x+5)(x-2)$
 f.c. = $x-2$

Rpta. E

2 $50n^3 - 2a + 50an^2 - 2n$
 $50n^2(n+a) - 2(n+a)$
 $(n+a) \cdot 2(25n^2 - 1)$
 $2(n+a)(5n+1)(5n-1)$
 $\therefore$ Un factor = $5n+1$

Rpta. B

3 $a^4 + a^3 - a^2 - a$
 $a^3(a+1) - a(a+1)$
 $(a+1)(a^3 - a)$
 $a(a+1)(a^2 - 1)$
 $a(a+1)^2(a-1)$
 $\therefore$ Un factor = $a-1$

Rpta. D

4 $8x^2 - 6ax - 12bx + 9ab$
 $2x(4x-3a) - 3b(4x-3a)$
 $(4x-3a)(2x-3b)$
 $\therefore$ Un factor = $4x-3a$

Rpta. C

5 $3am + 3bm + 3an + 3bn$
 $3m(a+b)(m+n)$
 $\therefore$ Un factor = $m+n$

Rpta. C

6 $ac + ad - acd - bc - bd + bcd$
 $c(a-b) + d(a-b) - cd(a-b)$
 $(a-b)(c+d-cd) \therefore$ Un factor = $a-b$

Rpta. C

7 $x^6 - y^6 = (x^3 y^3)(x^3 - y^3)$
 $x^6 - y^6 = (x^3 + y^3)(x-y)(x^2 + xy + y^2)$
 $\therefore$ Un factor = $x^2 + xy + y^2$

Rpta. D

8 $P(x;y) = x^2 + x^4y^4 - y^4 - x^2y^6$
 $P(x;y) = x^2(1 + x^2y^2) - y^4(1 + x^2y^2)$
 $P(x;y) = (1 + x^2y^2)(x-y^2)(x+y^2)$
 $\therefore$ Factor de mayor grado = $1 + x^2y^2$

Rpta. E

9 $6x^2 - 7x - 3$
 $3x \quad +1$
 $2x \quad -3$
 $\therefore 6x^2 - 7x - 3 = (3x+1)(2x-3)$
 Suma de factores = $5x-2$

Rpta. A

$$\begin{aligned}
 &10 \quad (a^2 - b^2)(a - c) + (a^2 - c^2)(a - b) \\
 &\quad (a + b)(a - b)(a - c) + (a + c)(a - c)(a - b) \\
 &\quad (a - b)(a - c)(2a + b + c) \\
 &\quad \therefore \text{Factor trinomio} = 2a + b + c
 \end{aligned}$$

Rpta. C

$$\begin{aligned}
 &11 \quad a^2b^2c^2 + ab^2c + abc^2 + bc \\
 &\quad ab^2c(ac + 1) + bc(ac + 1) \\
 &\quad (ac + 1) \cdot bc \cdot (ab + 1) \\
 &\quad bc(ac + 1)(ab + 1) \\
 &\quad \text{Un factor: } ac + 1
 \end{aligned}$$

Rpta. D

$$\begin{aligned}
 &12 \quad 2a^6b - 4a^4b + 2a^2b^5 \\
 &\quad 2a^2b(a^4 - 2a^2b^2 + b^4) \\
 &\quad 2a^2b(a^2 - b^2)^2 \\
 &\quad 2a^2b(a - b)^2(a + b)^2 \\
 &\quad \text{Un factor: } a - b
 \end{aligned}$$

Rpta. C

$$\begin{aligned}
 &13 \quad x^2 + 2xy + y^2 - 2x - 2y - 63 \\
 &\quad (x + y)^2 - 2(x + y) - 63 \\
 &\quad (x + y) \quad \quad - 9 \\
 &\quad (x + y) \quad \quad + 7 \\
 &\quad (x + y - 9)(x + y + 7) \\
 &\quad \therefore \text{Un factor} = x + y + 7
 \end{aligned}$$

Rpta. C

$$\begin{aligned}
 &14 \quad x^7 + y^3x^4 - y^4x^3 - y^7 \\
 &\quad x^4(x^3 + y^3) - y^4(x^3 + y^3) \\
 &\quad (x^3 + y^3)(x^4 - y^4) \\
 &\quad (x + y)(x^2 - xy + y^2)(x^2 + y^2)(x^2 - y^2) \\
 &\quad (x + y)^2(x^2 - xy + y^2)(x^2 + y^2)(x - y) \\
 &\quad \therefore \text{Hay 4 factores primos.}
 \end{aligned}$$

Rpta. C

$$\begin{aligned}
 &15 \quad a^2b - ab^2 + b^2c - bc^2 - a^2c + ac^2 \\
 &\quad b(a^2 - c^2) - b^2(a - c) - ac(a - c) \\
 &\quad (a - c)(ab + bc - b^2 - ac) \\
 &\quad (a - c)[(a - b) - c(a - b)] \\
 &\quad (a - c)(a - b)(b - c) \therefore \text{Un factor} = a - b
 \end{aligned}$$

Rpta. D

$$\begin{aligned}
 &16 \quad x^4a + x^4y - z^4a - z^4y \\
 &\quad x^4(a + y) - z^4(a + y) \\
 &\quad (a + y)(x^2 + z^2)(x^2 - z^2) \\
 &\quad (a + y)(x^2 + z^2)(x - z)(x + z) \\
 &\quad \therefore \text{Un factor} = a + y
 \end{aligned}$$

Rpta. C

$$\begin{aligned}
 &17 \quad x^3 + xz + x^2y^2 + y^2z \\
 &\quad x(x^2 + z) + y^2(x^2 + z) \\
 &\quad (x^2 + z)(x + y^2) \\
 &\quad \therefore \text{Un factor} = x + y^2
 \end{aligned}$$

Rpta. C

$$\begin{aligned}
 &18 \quad a^4 + 4 = a^4 + 4a^2 + 4 - 4a^2 \\
 &\quad = (a^2 + 2)^2 - (2a)^2 \\
 &\quad = (a^2 + 2a + 2)(a^2 - 2a + 2) \\
 &\quad \text{Suma de coeficientes} = 5
 \end{aligned}$$

Rpta. D

$$\begin{aligned}
 &19 \quad (x^2 - 1)(x + 2)(x + 3) + (x^2 - 1)(x + 4) + 1 - x^2 \\
 &\quad (x^2 - 1)(x + 2)(x + 3) + (x^2 - 1)(x + 4) - (x^2 - 1) \\
 &\quad (x^2 - 1)(x^2 + 5x + 6 + x + 4 - 1) \\
 &\quad (x + 1)(x - 1)(x^2 + 6x + 9) \\
 &\quad (x + 1)(x - 1)(x + 3)^2 \\
 &\quad \therefore \text{Factor repetido} = x + 3
 \end{aligned}$$

Rpta. E

$$\begin{aligned}
 &20 \quad 4a^2b^2 - (a^2 + b^2 - c^2)^2 \\
 &\quad (2ab + a^2 + b^2 - c^2)(2ab - a^2 - b^2 + c^2) \\
 &\quad [(a + b)^2 - c^2][c^2 - (a - b)^2] \\
 &\quad (a + b + c)(a + b - c)(a + b - c)(c - a + b) \\
 &\quad \therefore \text{Un factor} = a + b + c
 \end{aligned}$$

Rpta. B

$$\begin{aligned}
 &21 \quad F = (x^4 + x^3 + x^2 + x + 1)^2 - x^4 \\
 &\quad F = (x^4 + x^3 + x^2 + x + 1)(x^4 + x^3 + x^2 + x + 1 - x^4) \\
 &\quad F = (x^4 + x^3 + 2x^2 + x + 1)[x^3(x + 1) + (x + 1)] \\
 &\quad F = (x^4 + x^3 + 2x^2 + x + 1)(x + 1)^2(x^2 - x + 1) \\
 &\quad \therefore \text{Suma de coef. de un factor} = 6
 \end{aligned}$$

Rpta. A

Aplica tus aprendizajes 15

$$\begin{aligned}
 &1 \quad (x^{-1} + y^{-1})(x^{-1} - y^{-1}) \\
 &\quad \left(\frac{1}{x} + \frac{1}{y}\right)\left(\frac{1}{x} - \frac{1}{y}\right)
 \end{aligned}$$

Rpta. A

$$\begin{aligned}
 &2 \quad x^4 + 4y^4 = x^4 + 4x^2y^2 + 4y^4 - 4x^2y^2 \\
 &\quad = (x^2 + 2y^2)^2 - (2xy)^2 \\
 &\quad = (x^2 + 2y^2 + 2xy)(x^2 + 2y^2 - 2xy) \\
 &\quad x^4 + 4y^4 = (x^2 - 2xy + 2y^2)(x^2 + 2xy + 2y^2)
 \end{aligned}$$

Rpta. C

3 $a^2 - 2ab + b^2 - ac + bc$

$(a - b)^2 - c(a - b)$

$(a - b)(a - b - c)$

Rpta. D

4 $(x + 3)^2 - (x + 1)^2$

$(x + 3 + x + 1)(x + 3 - x - 1)$

$2 \cdot 2(x + 2) = 4(x + 2)$

Rpta. E

5 A) $(a + 2\sqrt{25} + \sqrt{5})(a + 2\sqrt{5} - \sqrt{5})$

$(a + 3\sqrt{5})(a + \sqrt{5})$

B) $\left(m - 3\sqrt{2} + \sqrt{8}\right)\left(m - 3\sqrt{2} - 2\sqrt{2}\right)$

$\left(m - 3\sqrt{2} + 2\sqrt{2}\right)\left(m - 3\sqrt{2} - 2\sqrt{2}\right)$

$(m - \sqrt{2})(m - 5\sqrt{2})$

C) $(2\sqrt{x} + 4 + \sqrt{3}x - 2)(2\sqrt{x} + 4 - \sqrt{3}x + 2)$

$(2\sqrt{x} + \sqrt{3}x + 2)(2\sqrt{x} - \sqrt{3}x + 6)$

D) $(4\sqrt{5} - 1 + 2\sqrt{5}y + 1)(4\sqrt{5} - 1 - 2\sqrt{5}y - 1)$

$(4\sqrt{5} + 2\sqrt{5}y)(4\sqrt{5} - 2\sqrt{5}y - 2)$

6 A) $(150 + 148)(150 - 142)$

$(298)(8) = 2\,384$

B) $(327 + 227)(327 - 227)$

$(554)(100) = 55\,400$

C) $(9\,999 + 1)(9\,999 - 1)$

$(10\,000)(9\,998) = 99\,980\,000$

D) $(672\,105 + 672\,104)(672\,105 - 672\,104)$

$(1\,344\,209)(1) = 1\,344\,209$

E) $(2\,013 + 2\,012)(2\,013 - 2\,012)$

$(4\,025)(1) = 4\,025$

7 $(y + 100)(y - 100)$

Rpta. C

8 $xy(xy - 3y^2)$

Rpta. B

9 $(x + 3)(x^2 - 1)$

$(x + 3)(x + 1)(x - 1)$

Rpta. A

10 $6y^2 - 7y - 3$

$(3y + 1)(2y - 3)$

Rpta. A

11 $-2n - 2a + 50an^2 + 50n^3$

$-2(n + a) + 50n^2(a + n)$

$(n + a)(-2 + 50n^2)$

$(n + a)(-2)(1 - 25n^2)$

$(n + a)(-2)(1 + 5n)(1 - 5n)$

Rpta. A

UNIDAD 5

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 1

I. $3x - 12 = 0 \rightarrow x = 4$

II. $4(x - 3) - 2 = 1 + 3x \rightarrow x = 15$

III. $9x - 8 = 3(x + 2) \rightarrow x = 7/3$

IV. $(2x + 3)^2 = x(2x - 1) + 2x(x + 3)$

$4x^2 + 12x + 9 = 4x^2 + 5x \rightarrow x = -9/7$

V. $6x(7 - x) = 36 - 2x(3x - 15)$

$42x - 6x^2 = 36 - 6x^2 + 30x \rightarrow x = 3$

Resolución 2

I. $\frac{x}{2} + \frac{x}{4} = x - 2$

$\frac{3}{4}x = x - 2$

$x = 8$

II. $\frac{3}{4}x - \frac{x}{3} = \frac{x - 2}{2}$

$\frac{5}{12}x = \frac{x - 2}{2}$

$x = 12$

III. $x + \frac{5}{3}x = 2(x + 1)$

$\frac{8}{3}x = 2x + 2$

$x = 3$

IV. $\frac{9 + x}{2} - \frac{8 - x}{3} = \frac{x + 1}{2} + x - 2$

$\frac{11 + 5x}{6} = \frac{3x - 3}{2}$

$11 + 5x = 9x - 9$

$x = 5$

V. $\frac{3}{5}(x + 9) + \frac{1}{10}(x - 11) = \frac{5}{3}(x + 2)$

$\frac{7x + 43}{10} = \frac{5}{3}(x + 2)$

$21x + 129 = 50x + 100$

$x = 1$

Resolución 3

I. $\frac{1}{x - 1} + \frac{2}{x} = \frac{5}{x^2 - x}$

$\frac{3x - 2}{x^2 - x} = \frac{5}{x^2 - x}$

$x = 7/3$

II. $\frac{1}{x - 1} = \frac{2}{x + 3}$

$x + 3 = 2x - 2$

$x = 5$

III. $\frac{1 - x}{x} + \frac{5}{x} = \frac{8 - x}{x + 3}$

$(6 - x)(x + 3) = x(8 - x)$

$3x + 18 - x^2 = 8x - x^2$

$x = 18/5$

IV. $\frac{x^2}{x - 3} - 3 = x + 3$

$x^2 - 3x + 9 = x^2 - 9$

$x = 6$

V. $\frac{1}{x} + \frac{1}{2x} = \frac{3x - 1}{2x^2 + 1}$

$\frac{3}{2x} = \frac{3x - 1}{2x^2 + 1}$

$6x^2 + 3 = 6x^2 - 2x$

$x = -3/2$

Resolución 4

I. $a(x + 1) - b(x - 1) = a + b + 1$

$ax + a - bx + b = a + b + 1$

$x = \frac{1}{a - b}$

II. $mx - n = \frac{m}{n} - n^2x$

$mnx - n^2 = m - n^3x$

$mnx + n^3x = m + n^2$

$x = \frac{m + n^2}{mn + n^3}$

$$\text{III. } \frac{a}{b} - x = \frac{ax - b}{b}$$

$$\frac{a - bx}{b} = \frac{ax - b}{b}$$

$$a + b = (a + b)x$$

$$x = 1$$

$$\text{IV. } \frac{a + bx}{a - 1} + x = \frac{a - x + 1}{a - 1}$$

$$a + bx + ax - x = a - x + 1$$

$$x = \frac{1}{a + b}$$

$$\text{V. } \frac{ax}{b} - \frac{b(x - b)}{a} = a$$

$$a^2x - b^2x + b^3 = a^2b$$

$$x(a^2 - b^2) = b(a^2 - b^2)$$

$$x = b$$

Resolución 5

$$\text{I. } (5x + 3)^2 + (8x + 15)(3x - 16) = (7x - 8)^2$$

$$25x^2 + 30x + 9 + 24x^2 - 83x - 240 = 49x^2 - 112x + 64$$

$$59x = 295$$

$$x = 5$$

$$\text{II. } (14x + 15)(14x - 15) = (14x - 5)^2 + 30$$

$$196x^2 - 225 = 196x^2 - 140x + 25 + 30$$

$$x = 2$$

$$\text{III. } 3(x - 3) + 2(3x - 1) - 4(x + 1) = 0$$

$$5x - 15 = 0$$

$$x = 3$$

$$\text{IV. } (x\sqrt{2} - 1)^2 + (\sqrt{2} + x)^2 = (\sqrt{3}x - 2)^2$$

$$2x^2 - 2\sqrt{2}x + 1 + 2 + 2\sqrt{2}x + x^2 = 3x^2 - 4\sqrt{3}x + 4$$

$$4\sqrt{3}x = 1$$

$$x = \frac{\sqrt{3}}{12}$$

$$\text{V. } 0,25x - 0,2x = 1$$

$$0,05x = 1$$

$$5x = 100$$

$$x = 20$$

Resolución 6

$$\text{I. } \frac{x + 2}{9} - \frac{x - 1}{3} + 1 = 0$$

$$x + 2 - 3x + 3 + 9 = 0$$

$$x = 7$$

$$\text{II. } \frac{x}{2} + \frac{x - 1}{3} - \frac{x + 1}{4} = 1$$

$$6x + 4x - 4 - 3x - 3 = 12$$

$$x = \frac{19}{7}$$

$$\text{III. } \frac{x}{2} - \frac{2}{3} = \frac{3x}{4} + \frac{1}{12}$$

$$-\frac{9}{12} = \frac{x}{4}$$

$$x = -3$$

$$\text{IV. } \frac{3x + 10}{2} - x - 4 = \frac{3x + 6}{4}$$

$$\frac{3x + 10 - 2x - 8}{2} = \frac{3x + 6}{4}$$

$$2x + 4 = 3x + 6$$

$$x = -2$$

$$\text{V. } \frac{3x + 7}{2} + 3x - 7 = \frac{2x + 3}{5}$$

$$45x - 35 = 4x + 6$$

$$x = 1$$

Resolución 7

$$\text{I. } \frac{x}{x + 1} + \frac{5}{8} = \frac{5}{2(x + 1)} + \frac{3}{4}$$

$$\frac{2x - 5}{2(x + 1)} = \frac{1}{8}$$

$$8x - 20 = x + 1$$

$$x = 3$$

$$\text{II. } \frac{5}{2x + 1} + \frac{4}{x - 1} = \frac{12x + 6}{2x^2 - x - 1}$$

$$\frac{13x - 1}{2x^2 - x - 1} = \frac{12x + 6}{2x^2 - x - 1} \rightarrow x = 7$$

$$\text{III. } \frac{4}{x - 2} - \frac{3}{x + 1} = \frac{8}{(x + 1)(x - 2)}$$

$$x + 10 = 8$$

$$x = -2$$

$$\text{IV. } \frac{1}{(x - 1)^2} - \frac{4}{2x - 2} = \frac{4}{2x - 2}$$

$$\frac{1}{(x - 1)(x - 1)} = \frac{8}{2(x - 1)}$$

$$1 = 4x - 4 \Rightarrow x = \frac{5}{4}$$

$$V. \frac{2x+4}{x-2} - \frac{3(x-2)}{2x+3} = \frac{x^2+78}{2x^2-x-6}$$

$$4x^2 + 14x + 12 - 3x^2 + 12x - 12 = x^2 + 78$$

$$x = 3$$

Resolución 8

$$I. a(x+b) = a^2 + b^2 + b(x-a)$$

$$ax + ab = a^2 + b^2 + bx - ab$$

$$(a-b)x = (a-b)^2$$

$$x = a-b$$

$$II. \frac{a}{x} + \frac{b}{2} = \frac{4a}{x}$$

$$\frac{b}{2} = \frac{3a}{x}$$

$$x = \frac{6a}{b}$$

$$III. \frac{x}{2a} - \frac{1-x}{a^2} = \frac{1}{2a}$$

$$\frac{x-1}{2a} = \frac{1-x}{a^2}$$

$$ax - a = 2 - 2x$$

$$(a+2)x = a+2$$

$$x = 1$$

$$IV. \frac{4x}{2a+b} + \frac{3}{2} = 3$$

$$\frac{4x}{2a+b} = \frac{3}{2}$$

$$8x = 6a + 3b$$

$$x = \frac{6a+3b}{8}$$

$$V. \frac{x-a}{2b} - \frac{x+3b}{3a} = \frac{3a-13b}{6b}$$

$$\frac{3ax - 3a^2 - 2bx - 6b^2}{6ab} = \frac{3a-13b}{6b}$$

$$(3a-2b)x = 6a^2 - 13ab + 6b^2$$

$$(3a-2b)x = (3a-2b)(2a-3b)$$

$$x = 2a-3b$$

Aplica tus aprendizajes 2

Resolución 1

$$I. (x+5)(x-5) = x^2 + 10x \dots(F)$$

$$II. x(x+6) = x^2 + 6x \dots(V)$$

$$III. 3x-5 = 2x+8 \dots(F)$$

$$IV. (a+1)^2 = a^2 + 2a + 1 \dots(V)$$

Rpta. C

Resolución 2

$$I. x^2 + 6x = x^2 + 6x \dots(F)$$

$$II. (x+3)(x+5) = x^2 + 8x + 15 \dots(F)$$

$$III. 2(x-3) = 4(x+1) \dots(V)$$

$$IV. (x+3)(x-3) = x^2 - 9 \dots(F)$$

Rpta. C

Resolución 3

$$I. 5x - 31 = x - 20 + 4x \dots(F)$$

$$II. 7x - (3x + 9) = (3x + 3) + (x - 6) \dots(F)$$

$$III. 9x - 7 = 8x - 5 \dots(V)$$

$$IV. 8(2x - 7) = 16x - 56 \dots(F)$$

$$V. 12x - 1 = 4(3x - 1) \dots(F)$$

Rpta. C

Resolución 4

$$I. 4; 5x = 20$$

$$II. 3; 2x - 5 = 3x - 8$$

$$V. 26; 3(x-2) = 24$$

Rpta. D

Resolución 5

$$A) 2(x+3) = x-7$$

$$x = -13$$

$$B) 3(x-5) = 4(x-10)$$

$$x = 25$$

$$C) 5(x+4) = 2x+17$$

$$x = -1$$

$$D) 5(x-3) = 4x-7$$

$$x = 8$$

$$E) 4(x+7) = 2x-10$$

Rpta. D

Para las preguntas 6; 7; 8 y 9 las respuestas son libres.

Aplica tus aprendizajes 3

Resolución 1

$$100x + 50y = 1\,950 \quad ; \quad x + y = 24$$

$$2x + y = 39$$

$$2x + 24 - x = 39$$

$$x = 15$$

Rpta. C

Resolución 2

$$x + y = 240 \quad ; \quad x = 3y + 8$$

$$4y + 8 = 240 \quad x = 182$$

$$y = 58$$

Rpta. A

Resolución 3

$$P_1 = \frac{1}{9} \cdot 9x = x$$

$$P_2 = \frac{9}{20} \cdot 20x = 9x$$

$$P_2 = 20x$$

$$P_1 + P_2 + P_3 = 90$$

$$30x = 90$$

$$x = 3$$

$$\therefore P_2 = 9x$$

$$P_2 = 27$$

Rpta. B

Resolución 4

$$x + y = 54 \quad ; \quad \frac{x}{5} = \frac{y}{4}$$

$$\frac{5}{4}y + y = 54 \quad x = \frac{5}{4}y$$

$$3y = 72$$

Rpta. B

Resolución 5

$$\frac{4}{5}(a + b) = 32 \quad ; \quad \frac{10}{9}(a - b) = 20$$

$$a + b = 40 \dots(I)$$

$$a - b = 18 \dots(II)$$

Restamos (I) - (II):

$$2b = 22$$

$$b = 11$$

Rpta. C

Resolución 6

$$x + y = 32 \quad \wedge \quad x = 5y + 2$$

$$6y = 30$$

$$y = 5 \quad \wedge \quad x = 27$$

Rpta. D

Resolución 7

José : x

Antonio: y

$$x + y = 45 \quad \wedge \quad x + 5 = 2(y - 5)$$

$$3y = 60$$

$$x = 2y - 15$$

$$y = 20$$

Rpta. B

Resolución 8

$$a + \frac{b}{2} = b + \frac{a}{3} = 10 \quad ; \quad 3b + a = 30$$

$$\frac{2a}{3} = \frac{b}{2}$$

$$3b + \frac{3}{4}b = 30$$

$$a = \frac{3}{4}b$$

$$b = 8$$

Rpta. B

Resolución 9

$$\frac{x}{y} = 13 \quad ; \quad x - y = 180$$

$$x = 13y$$

$$12y = 180$$

$$y = 15$$

$$\therefore x = 195$$

Rpta. C

Resolución 10

$$x - y = 35 \quad ; \quad x - \frac{y}{2} = 65$$

$$x = 35 + y \quad 35 + \frac{y}{2} = 65$$

$$x = 95$$

$$\wedge$$

$$y = 60$$

Rpta. C

Resolución 11

$$\frac{a}{b} = 12 \quad ; \quad a + b = 169$$

$$a = 12b$$

$$13b = 169$$

$$b = 13$$

Rpta. B

Resolución 12

$$x + y = 1\,200 \quad ; \quad 2x - y = 300$$

$$y = 1\,200 - x$$

$$3x - 1\,200 = 300$$

$$y = 700$$

$$\wedge$$

$$x = 500$$

Rpta. A

Resolución 13

$$\frac{a}{b} = \frac{10}{5} \quad ; \quad \frac{a-20}{b+20} = \frac{5}{10}$$

$$a = 2b$$

$$4b - 40 = b + 20$$

$$a = 40$$

$$\wedge$$

$$b = 20$$

Rpta. C

Resolución 14

$$x + y = 260 \quad ; \quad 2x = 2(3y) + 40$$

$$4y + 20 = 260 \quad x = 3y + 20$$

$$y = 60 \quad \wedge \quad x = 200 \quad \text{Rpta. C}$$

Resolución 15

$$S = 2A - 14 \quad ; \quad \frac{S}{5} = A - 13$$

$$5A - 65 = 2A - 14 \quad S = 5A - 65$$

$$A = 17 \text{ años} \quad \text{Rpta. D}$$

Resolución 16

$$x - 2y = 1 \quad \wedge \quad 2x - y = 23$$

$$x = 2y + 1 \quad 4y + 2 - y = 23$$

$$x = 15 \quad \wedge \quad y = 7$$

$$\therefore x + y = 22 \quad \text{Rpta. C}$$

Resolución 17

$$\text{Alicia} = 15x$$

$$\text{Jorge} = \frac{2}{3} \cdot 15x = 10x$$

$$\text{Mónica} = \frac{3}{5} \cdot 10x = 6x$$

$$15x + 10x + 6x = 24\,800$$

$$x = 800$$

$$\therefore \text{Jorge} = S/. 8\,000 \quad \text{Rpta. B}$$

Resolución 18

$$\text{Gastó} = S/. 200$$

$$\text{Prestó} = \frac{2}{3}(x - 200)$$

$$x - 200 - \frac{2}{3}(x - 200) = 100$$

$$x - \frac{2}{3}x = 300 - \frac{400}{3}$$

$$x = S/. 500 \quad \text{Rpta. A}$$

Resolución 19

$$\text{Fracción: } \frac{x}{y} \quad \frac{x-4}{y} = \frac{1}{3}$$

$$y - 2x = 1 \quad y = 3x - 12$$

$$x - 12 = 1 \quad y = 3x - 12$$

$$x = 13 \quad y = 27$$

$$\therefore \text{fracción} = \frac{13}{27} \quad \text{Rpta. D}$$

Resolución 20

$$\text{Hombres} = x$$

$$\text{Mujeres} = 2x \Rightarrow x + 2x + 9x = 156$$

$$\text{Niños} = 3(3x) \quad x = 13 \quad \text{Rpta. D}$$

Resolución 21

$$P_1 = x$$

$$P_2 = 3 + 2x$$

$$x + 3 + 2x = 51$$

$$x = 16$$

$$P_2 = 35 \quad \text{Rpta. C}$$

Resolución 22

$$P + G = 22 \quad \wedge \quad 8P + 7G = 166$$

$$P + 7(P + G) = 166$$

$$P = 12 \quad \text{Rpta. D}$$

Resolución 23

$$x + y = 2\,000 \quad \wedge \quad 4x - 60 = y + 30$$

$$y = 2\,000 - x \quad 5x = 2\,090$$

$$y = 2\,000 - 418 \quad x = 418$$

$$y = 1\,582 \quad \text{Rpta. C}$$

Resolución 24

$$\text{Número} = ab$$

$$\overline{ab} - \overline{ba} = 36 \quad ; \quad a + b = 12 \quad \dots (II)$$

$$10a + b - 10b - a = 36$$

$$9(a - b) = 36$$

$$a - b = 4 \quad \dots (I)$$

$$(I) + (II)$$

$$2a = 16$$

$$a = 8 \quad \wedge \quad b = 4$$

$$\therefore \text{Número} = 84 \quad \text{Rpta. D}$$

Resolución 25

$$\text{Padre} = 6x \quad 6x + x = 91$$

$$\text{Hijo} = x \quad 7x = 91$$

$$x = 13$$

$$\therefore \text{Padre} = 78 \text{ años}$$

$$\text{Rpta. B}$$

Resolución 26

fracción: $\frac{a}{b}$

$$\frac{a-5}{b+8} = 1 \quad ; \quad \frac{a}{b-7} = 3$$

$$a-5 = b+8 \quad a = 3b-21$$

$$a-b = 13 \quad a = 30$$

$$2b = 34$$

$$b = 17$$

$$\therefore \text{fracción} = \frac{30}{17}$$

Rpta. C

Resolución 27

Número = $\overline{ab}$

$$a+b = 12 \quad ; \quad b = 2+a$$

$$2a = 10$$

$$a = 5 \quad \wedge \quad b = 7$$

$$\therefore \text{Número} = 57$$

Rpta. C

Resolución 28

$$\text{Primero} = x - 400$$

$$\text{Segundo} = x - 220$$

$$x - 400 = \frac{x - 220}{2}$$

$$2x - 800 = x - 220 \Rightarrow x = 580$$

Rpta. C

Resolución 29

$$10x + 50y = 1480 \quad ; \quad x + y = 60$$

$$600 - 10y + 50y = 1480 \quad x = 60 - y$$

$$y = 22$$

Rpta. C

Resolución 30

Número: $\overline{ab}$

$$b = 1 + 2a \quad \wedge \quad a + b = 10$$

$$b = 7 \quad 3a = 9$$

$$a = 3$$

$$\therefore \text{Número} = 37$$

Rpta. D

Resolución 31

$$2B + 3T = 60 \quad \wedge \quad B = T + 5$$

$$2B + 3B - 15 = 60 \quad T = B - 5$$

$$5B = 75$$

$$B = 15$$

Rpta. B

Resolución 32

Correctas: x

Erradas: y

$$x + y = 50 \quad \wedge \quad 2x - y = 64$$

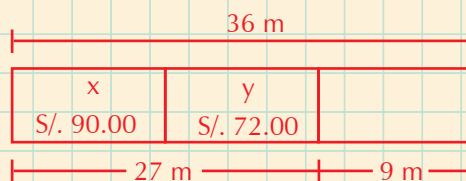
$$y = 50 - x \quad 2x - 50 + x = 64$$

$$3x = 144$$

$$x = 38$$

Rpta. D

Resolución 33



$$x + y = 27 \quad \wedge \quad \frac{90}{x} = \frac{72}{y}$$

$$\frac{5}{4}y + y = 27 \quad \frac{x}{y} = \frac{5}{4}$$

$$y = 12$$

$$\therefore \text{Precio} = \frac{72}{y} = \text{S}/.6 \quad \text{Rpta. C}$$

Aplica tus aprendizajes 4

a) $x(x+2) = 15$

$$x^2 + 2x - 15 = 0$$

$$\begin{array}{c} x \quad 5 \\ x \quad -3 \end{array}$$

$$(x+5)(x-3) = 0$$

$$1) x+5 = 0 \rightarrow x = -5$$

$$2) x-3 = 0 \rightarrow x = 3$$

$$\therefore \text{CS} = \{-5; 3\} \quad \text{Rpta.}$$

b) $x^2 + 14 = 9x$

$$x^2 - 9x + 14 = 0$$

$$\begin{array}{c} x \quad -7 \\ x \quad -2 \end{array}$$

$$(x-7)(x-2) = 0$$

$$1) x-7 = 0 \rightarrow x = 7$$

$$2) x-2 = 0 \rightarrow x = 2$$

$$\therefore \text{CS} = \{2; 7\} \quad \text{Rpta.}$$

c) $x^2 - 8(x - 2) = 0$

$x^2 - 8x + 16 = 0$



$(x - 4)(x - 4) = 0$

$x - 4 = 0 \rightarrow x = 4 \quad \therefore \text{CS} = \{4\} \text{ Rpta.}$

d) $(x - 1)(x + 3) = 12$

$x^2 + 2x - 3 = 12$

$x^2 + 2x - 15 = 0$



$(x + 5)(x - 3) = 0$

1) $x + 5 = 0 \rightarrow x = -5$

2) $x - 3 = 0 \rightarrow x = 3 \quad \therefore \text{CS} = \{3; -5\} \text{ Rpta.}$

e) $(x + 3)^2 + (x - 2)^2 = 25$

$x^2 + 6x + 9 + x^2 - 4x + 4 = 25$

$2x^2 + 2x - 12 = 0$

$x^2 + x - 6 = 0$



$(x + 3)(x - 2) = 0$

1) $x + 3 = 0 \rightarrow x = -3$

2) $x - 2 = 0 \rightarrow x = 2 \quad \therefore \text{CS} = \{2; -3\} \text{ Rpta.}$

f) $(x - 2)^2 + (x + 1)(x - 3) = 4x + 1$

$x^2 - 4x + 4 + x^2 - 2x - 3 = 4x + 1$

$2x^2 - 10x = 0$

$x^2 - 5x = 0$

$x(x - 5) = 0$

$x = 0; x - 5 = 0 \rightarrow x = 5$

$\therefore \text{CS} = \{0; 5\} \text{ Rpta.}$

g) $\frac{2}{3}(x + 4) + x^2 = 3$

$2x + 8 + 3x^2 = 9$

$3x^2 + 2x - 1 = 0$



$(x + 1)(3x - 1) = 0$

1) $x + 1 = 0 \rightarrow x = -1$

2) $3x - 1 = 0 \rightarrow x = \frac{1}{3}$

$\therefore \text{CS} = \left\{\frac{1}{3}; -1\right\} \text{ Rpta.}$

h) $\frac{x^2 + 35}{12} = x$

$x^2 - 12x + 35 = 0$



$(x - 7)(x - 5) = 0$

1) $x - 7 = 0 \rightarrow x = 7$

2) $x - 5 = 0 \rightarrow x = 5 \quad \therefore \text{CS} = \{5; 7\} \text{ Rpta.}$

i) $2(3x + 8) = x^2$

$6x + 16 = x^2$

$x^2 - 6x - 16 = 0$



$(x - 8)(x + 2) = 0$

1) $x - 8 = 0 \rightarrow x = 8$

2) $x + 2 = 0 \rightarrow x = -2$

$\therefore \text{CS} = \{8; -2\} \text{ Rpta.}$

j) $16x = x^2 + 60$

$x^2 - 16x + 60 = 0$



$(x - 6)(x - 10) = 0$

1) $x - 6 = 0 \rightarrow x = 6$

2) $x - 10 = 0 \rightarrow x = 10$

$\therefore \text{CS} = \{6; 10\} \text{ Rpta.}$

2. Analiza cada ecuación cuadrática y determina los valores de la incógnita

a) $y^2 - 3y = 10$

$y^2 - 3y - 10 = 0$



$(y + 2)(y - 5) = 0$

1) $y + 2 = 0 \rightarrow y = -2$

2) $y - 5 = 0 \rightarrow y = 5$

$\therefore \text{CS} = \{-2; 5\} \text{ Rpta.}$

b) $m^2 - 6m + 8 = 0$



$(m - 4)(m - 2) = 0$

1) $m - 4 = 0 \rightarrow m = 4$

2) $m - 2 = 0 \rightarrow m = 2$

$\therefore \text{CS} = \{2; 4\} \text{ Rpta.}$

c) $y^2 - 21 = -4y$
 $y^2 + 4y - 21 = 0$

$$\begin{array}{c} x \quad \quad 7 \\ \diagup \quad \diagdown \\ x \quad \quad -3 \end{array}$$

$$(y + 7)(y - 3) = 0$$

1) $y + 7 = 0 \rightarrow y = -7$
 2) $y - 3 = 0 \rightarrow y = 3$

$\therefore CS = \{3; -7\}$ **Rpta.**

d) $y^2 = -20 + 9y$
 $y^2 - 9y + 20 = 0$

$$\begin{array}{c} y \quad \quad -5 \\ \diagup \quad \diagdown \\ y \quad \quad -4 \end{array}$$

$$(y - 5)(y - 4) = 0$$

1) $y - 5 = 0 \rightarrow y = 5$
 2) $y - 4 = 0 \rightarrow y = 4$

$\therefore CS = \{4; 5\}$ **Rpta.**

e) $x^2 + x - 6 = 6$
 $x^2 + x - 12 = 0$

$$\begin{array}{c} x \quad \quad -3 \\ \diagup \quad \diagdown \\ x \quad \quad 4 \end{array}$$

$$(x - 3)(x + 4) = 0$$

1) $x - 3 = 0 \rightarrow x = 3$
 2) $x + 4 = 0 \rightarrow x = -4$

$\therefore CS = \{3; -4\}$ **Rpta.**

f) $(x + 8)(x - 8) = 0$
 $x^2 - 8^2 = 0$
 $x^2 - 64 = 0$
 $x^2 = 64 \rightarrow x = \pm 8$

$\therefore CS = \{-8; 8\}$ **Rpta.**

g) $\frac{4}{y} = \frac{1}{3} + \frac{2}{y-1}$
 $\frac{4}{y} = \frac{y-1+6}{3(y-1)}$
 $12(y-1) = y(y+5)$
 $12y - 12 = y^2 + 5y$
 $y^2 - 7y + 12 = 0$

$$\begin{array}{c} y \quad \quad -3 \\ \diagup \quad \diagdown \\ y \quad \quad -4 \end{array}$$

$$(y - 3)(y - 4) = 0$$

1) $y - 3 = 0 \rightarrow y = 3$
 2) $y - 4 = 0 \rightarrow y = 4$

$\therefore CS = \{3; 4\}$ **Rpta.**

h) $(y - 3)^2 = 81$
 $y^2 - 6y + 9 - 81 = 0$
 $y^2 - 6y - 72 = 0$

$$\begin{array}{c} y \quad \quad -12 \\ \diagup \quad \diagdown \\ y \quad \quad 6 \end{array}$$

$$(y - 12)(y + 6) = 0$$

1) $y - 12 = 0 \rightarrow y = 12$
 2) $y + 6 = 0 \rightarrow y = -6$

$\therefore CS = \{12; -6\}$ **Rpta.**

i) $(a + 2)^2 = 25$
 $a^2 + 4a + 4 - 25 = 0$
 $a^2 + 4a - 21 = 0$
 $(a + 7)(a - 3) = 0$

1) $a + 7 = 0 \rightarrow a = -7$
 2) $a - 3 = 0 \rightarrow a = 3$

$\therefore CS = \{3; -7\}$ **Rpta.**

j) $10y^2 - 5y = 30$
 $10y^2 - 5y - 30 = 0$
 $2y^2 - y - 6 = 0$

$$\begin{array}{c} 2y \quad \quad 3 \\ \diagup \quad \diagdown \\ y \quad \quad -2 \end{array}$$

$$(2y + 3)(y - 2) = 0$$

1) $2y + 3 = 0 \rightarrow y = -\frac{3}{2}$
 2) $y - 2 = 0 \rightarrow y = 2$

$\therefore CS = \left\{-\frac{3}{2}; 2\right\}$ **Rpta.**

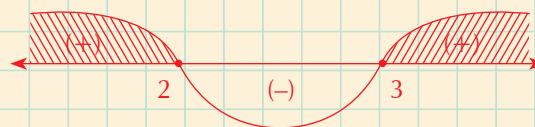
3. Analiza cada ecuación de segundo grado y determina el C.S.:

a) $x^2 - 5x > -6$
 $x^2 - 5x + 6 > 0$

$$\begin{array}{c} x \quad \quad -2 \\ \diagup \quad \diagdown \\ x \quad \quad -3 \end{array}$$

$$(x - 2)(x - 3) > 0$$

1) $x - 2 = 0 \rightarrow x = 2$
 2) $x - 3 = 0 \rightarrow x = 3$



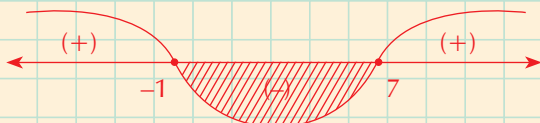
$\therefore CS = <-\infty; 2) \cup [3; +\infty>$ **Rpta.**

b) $x^2 - 6x \leq 7$
 $x^2 - 6x - 7 \leq 0$

$x \quad \begin{array}{c} \uparrow \\ \times \end{array} \quad \begin{array}{c} -7 \\ 1 \end{array}$
 $(x - 7)(x + 1) \leq 0$

1) $x - 7 = 0 \rightarrow x = 7$

2) $x + 1 = 0 \rightarrow x = -1$



$\therefore CS = [-1 ; 7]$ Rpta.

c) $2x(x - 9) + 40 \geq 0$
 $2x^2 - 18x + 40 \geq 0$
 $x^2 - 9x + 20 \geq 0$

$x \quad \begin{array}{c} \uparrow \\ \times \end{array} \quad \begin{array}{c} -4 \\ -5 \end{array}$
 $(x - 4)(x - 5) \geq 0$

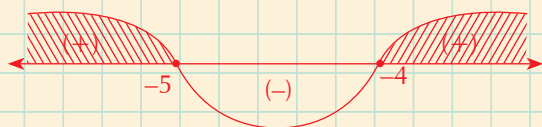
1) $x - 4 = 0 \rightarrow x = 4$

2) $x - 5 = 0 \rightarrow x = 5$

$(x + 4)(x + 5) \geq 0$

1) $x + 4 = 0 \rightarrow x = -4$

2) $x + 5 = 0 \rightarrow x = -5$



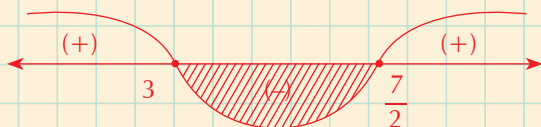
$\therefore CS = <-\infty ; -5] \cup [-4 ; +\infty>$ Rpta.

d) $2(x^2 + 11) - 13x < 1$
 $2x^2 + 22 - 13x - 1 < 0$
 $2x^2 - 13x + 21 < 0$

$2x \quad \begin{array}{c} \uparrow \\ \times \end{array} \quad \begin{array}{c} -7 \\ -3 \end{array}$
 $(2x - 7)(x - 3) < 0$

1) $2x - 7 = 0 \rightarrow x = \frac{7}{2}$

2) $x - 3 = 0 \rightarrow x = 3$



$\therefore CS = <3 ; \frac{7}{2}>$ Rpta.

e) $2x^2 + 9 > \frac{17}{2}x$

$2x^2 + 9 - \frac{17}{2}x > 0$

$4x^2 + 18 - 17x > 0$

$4x^2 - 17x + 18 > 0$

$x \quad \begin{array}{c} \uparrow \\ \times \end{array} \quad \begin{array}{c} -2 \\ -9 \end{array}$
 $(x - 2)(4x - 9) > 0$

1) $x - 2 = 0 \rightarrow x = 2$

2) $4x - 9 = 0 \rightarrow x = \frac{9}{4}$



$\therefore CS = <-\infty ; 2> \cup <\frac{9}{4} ; +\infty>$ Rpta.

Aplica tus aprendizajes 5

8. Halla la suma de las raíces de las siguientes ecuaciones:

1. $2x^2 + 6 = 3x$

$2x^2 - 3x + 6 = 0$

$S = \frac{-(-3)}{2} \rightarrow \therefore S = \frac{3}{2}$

2. $x^2 + x = -\frac{7}{4}$

$4x^2 + 4x + 7 = 0$

$S = -\frac{4}{4} \rightarrow \therefore S = -1$

3. $6x(x - 1) = 5(x^2 - 1)$

$6x^2 - 6x = 5x^2 - 5$

$x^2 - 6x + 5 = 0$

$S = \frac{-(-6)}{1} \rightarrow \therefore S = 6$

4. $2x^2 = 8x - 5$

$2x^2 - 8x + 5 = 0$

$S = -\frac{(-8)}{2} \rightarrow \therefore S = 4$

5. $\frac{2}{3}(x + 3) - x^2 + 5 = x$

$2x + 6 - 3x^2 + 15 = 3x$

$3x^2 + x - 21 = 0$

$\therefore S = \frac{-1}{3}$

$$6. \quad 2x^2 = 5 - 3x$$

$$2x^2 + 3x - 5 = 0 \quad \therefore S = -\frac{3}{2}$$

$$7. \quad x^2 - 8x = -7$$

$$x^2 - 8x + 7 = 0$$

$$S = -\frac{(-8)}{1} \rightarrow \therefore S = 8$$

$$8. \quad y^2 = 9 - 3y$$

$$y^2 + 3y - 9 = 0$$

$$S = -\frac{3}{1} \rightarrow \therefore S = -3$$

$$9. \quad -7y + 2y^2 = -1$$

$$2y^2 - 7y + 1 = 0$$

$$S = \frac{-(-7)}{2} \rightarrow \therefore S = \frac{7}{2}$$

$$10. \quad 3x^2 = 12$$

$$x^2 + 0x - 4 = 0$$

$$S = \frac{0}{1} \rightarrow \therefore S = 0$$

9. Halla el producto de las raíces de las siguientes ecuaciones:

$$1. \quad 2x^2 - 3x + 5 = 0$$

$$P = \frac{5}{2}$$

$$2. \quad x^2 = 3(x + 2)$$

$$x^2 - 3x - 6 = 0$$

$$P = -6$$

$$3. \quad x^2 + \frac{1}{2}x = \frac{1}{2}$$

$$2x^2 + x - 1 = 0$$

$$P = -\frac{1}{2}$$

$$4. \quad 2x^2 - 5x = 8$$

$$2x^2 - 5x - 8 = 0$$

$$S = -\frac{8}{2} \rightarrow P = -4$$

$$5. \quad (x - 3)^2 = 2x + 15$$

$$x^2 - 6x + 9 = 2x + 15$$

$$x^2 - 8x - 6 = 0$$

$$P = -6$$

$$6. \quad x^2 + 3x = 9$$

$$x^2 + 3x - 9 = 0$$

$$P = -9$$

$$7. \quad 2x^2 + 1 = 7x$$

$$2x^2 - 7x + 1 = 0$$

$$P = \frac{1}{2}$$

$$8. \quad 8x^2 - 4 = 5x$$

$$8x^2 - 5x - 4 = 0$$

$$P = -\frac{4}{8} \rightarrow P = -\frac{1}{2}$$

$$9. \quad 3x^2 - 8x = -15$$

$$3x^2 - 8x + 15 = 0$$

$$P = \frac{15}{3} \rightarrow P = 5$$

$$10. \quad (2x - 3)^2 + 4 = 10x + 45$$

$$4x^2 - 12x + 9 + 4 = 10x + 45$$

$$4x^2 - 22x - 32 = 0$$

$$2x^2 - 11x - 16 = 0$$

$$P = -\frac{16}{2} \rightarrow P = -8$$

10. Escribe las ecuaciones cuyas raíces son:

$$1. \quad 2 \text{ y } 3$$

$$x^2 - (2 + 3)x + 2 \cdot 3 = 0$$

$$x^2 - 5x + 6 = 0 \text{ Rpta.}$$

$$2. \quad 7 \text{ y } -1$$

$$x^2 - (7 - 1)x + 7(-1) = 0$$

$$x^2 - 6x - 7 = 0 \text{ Rpta.}$$

$$3. \quad 3 + \sqrt{7} \text{ y } 3 - \sqrt{7}$$

$$x^2 - (3 + \sqrt{7} + 3 - \sqrt{7})x + (3 + \sqrt{7})(3 - \sqrt{7}) = 0$$

$$x^2 - 6x + 9 - 7 = 0$$

$$x^2 - 6x + 2 = 0 \text{ Rpta.}$$

$$4. \quad 8 + \sqrt{63} \text{ y } 8 - \sqrt{63}$$

$$x^2 - (8 + \sqrt{63} + 8 - \sqrt{63})x + (8 + \sqrt{63})(8 - \sqrt{63}) = 0$$

$$x^2 - 16x + 64 - 63 = 0$$

$$x^2 - 16x + 1 = 0 \text{ Rpta.}$$

5. $\frac{5+\sqrt{3}}{2}$ y $\frac{5-\sqrt{3}}{2}$

$$x^2 - \left(\frac{5+\sqrt{3}}{2} + \frac{5-\sqrt{3}}{2}\right)x + \left(\frac{5+\sqrt{3}}{2}\right)\left(\frac{5-\sqrt{3}}{2}\right) = 0$$

$$x^2 - 5x + \frac{25-3}{4} = 0$$

$$x^2 - 5x + \frac{11}{2} = 0$$

$$2x^2 - 10x + 11 = 0 \quad \text{Rpta.}$$

6. $\frac{7+\sqrt{2}}{4}$ y $\frac{7-\sqrt{2}}{4}$

$$x^2 - \left(\frac{7+\sqrt{2}}{4} + \frac{7-\sqrt{2}}{4}\right)x + \left(\frac{7+\sqrt{2}}{4}\right)\left(\frac{7-\sqrt{2}}{4}\right) = 0$$

$$x^2 - \frac{14}{4}x + \frac{47}{16} = 0$$

$$16x^2 - 56x + 47 = 0 \quad \text{Rpta.}$$

7. $\frac{1}{3}$ y $-\frac{2}{3}$

$$x^2 - \left(\frac{1}{3} - \frac{2}{3}\right)x + \left(\frac{1}{3}\right)\left(-\frac{2}{3}\right) = 0$$

$$x^2 + \frac{1}{3}x - \frac{2}{9} = 0$$

$$9x^2 + 3x - 2 = 0 \quad \text{Rpta.}$$

8. $\sqrt{6} + \sqrt{2}$ y $\sqrt{6} - \sqrt{2}$

$$x^2 - (\sqrt{6} + \sqrt{2} + \sqrt{6} - \sqrt{2})x + (\sqrt{6} + \sqrt{2})(\sqrt{6} - \sqrt{2}) = 0$$

$$x^2 - 2\sqrt{6}x + 6 - 2 = 0$$

$$x^2 - 2\sqrt{6}x + 4 = 0 \quad \text{Rpta.}$$

9. $\sqrt{3}$ y $-\sqrt{3}$

$$x^2 - (\sqrt{3} - \sqrt{3})x + (\sqrt{3})(-\sqrt{3}) = 0$$

$$x^2 - 3 = 0 \quad \text{Rpta.}$$

10. $\frac{1+\sqrt{5}}{4}$ y $\frac{1-\sqrt{5}}{4}$

$$x^2 - \left(\frac{1+\sqrt{5}}{4} + \frac{1-\sqrt{5}}{4}\right)x + \left(\frac{1+\sqrt{5}}{4}\right)\left(\frac{1-\sqrt{5}}{4}\right) = 0$$

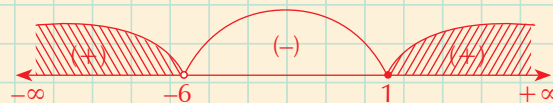
$$x^2 - \frac{1}{2}x + \left(\frac{1-5}{4}\right) = 0$$

$$x^2 - \frac{1}{2}x - 1 = 0$$

$$2x^2 - x - 2 = 0 \quad \text{Rpta.}$$

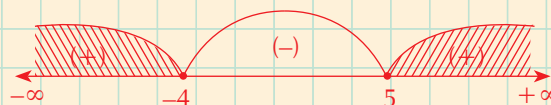
11. Si se sabe que las siguientes gráficas representan el conjunto solución de una inecuación cuadrática, escribe el intervalo respectivo.

A.



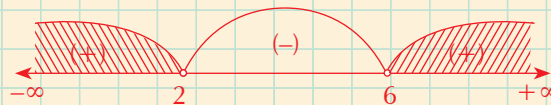
$$CS = < -\infty ; -6 > \cup [1 ; +\infty >$$

B.



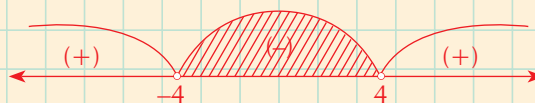
$$CS = < -\infty ; -4 > \cup [5 ; +\infty >$$

C.



$$CS = < -\infty ; 2 > \cup < 6 ; +\infty >$$

D.



$$CS = < -4 ; 4 >$$

E.



$$CS = < -\infty ; -8] \cup < 6 ; +\infty >$$

Aplica tus aprendizajes 6

1. Resuelve las siguientes ecuaciones cuadráticas

a. $x^2 - 7x + 12 = 0$

$$\begin{array}{c} x \\ x \end{array} \begin{array}{c} \nearrow -4 \\ \searrow -3 \end{array}$$

$$(x - 4)(x - 3) = 0$$

1) $x - 4 = 0 \rightarrow x = 4$

2) $x - 3 = 0 \rightarrow x = 3$

$$\therefore \text{CS} = \{3; 4\}$$

b. $x^2 + 9x = -20$

$$x^2 + 9x + 20 = 0$$

$$\begin{array}{c} x \\ x \end{array} \begin{array}{c} \nearrow 4 \\ \searrow 5 \end{array}$$

$$(x + 4)(x + 5) = 0$$

1) $x + 4 = 0 \rightarrow x = -4$

2) $x + 5 = 0 \rightarrow x = -5$

$$\therefore \text{CS} = \{-4; -5\}$$

c. $x^2 - 15 = 2x$

$$x^2 - 2x - 15 = 0$$

$$\begin{array}{c} x \\ x \end{array} \begin{array}{c} \nearrow -5 \\ \searrow 3 \end{array}$$

$$(x - 5)(x + 3) = 0$$

1) $x - 5 = 0 \rightarrow x = 5$

2) $x + 3 = 0 \rightarrow x = -3$

$$\therefore \text{CS} = \{5; -3\}$$

d. $2x^2 - 3x = 5$

$$2x^2 - 3x - 5 = 0$$

$$\begin{array}{c} 2x \\ x \end{array} \begin{array}{c} \nearrow -5 \\ \searrow 1 \end{array}$$

$$(2x - 5)(x + 1) = 0$$

1) $2x - 5 = 0 \rightarrow x = 5/2$

2) $x + 1 = 0 \rightarrow x = -1$

$$\therefore \text{CS} = \{5/2; -1\}$$

e. $8x^2 - 6x + 1 = 0$

$$x = \frac{6 \pm \sqrt{6^2 - 4 \cdot 8 \cdot 1}}{2 \cdot 8} = \frac{6 \pm 2}{16}$$

1) $x_1 = \frac{6+2}{16} = \frac{1}{2}$

2) $x_2 = \frac{6-2}{16} = \frac{1}{4}$

$$\therefore \text{CS} = \left\{ \frac{1}{2}; \frac{1}{4} \right\}$$

2. Resuelve los siguientes problemas

a. Sea x el número:

$$x^2 = x + 30$$

$$x^2 - x - 30 = 0$$

$$\begin{array}{c} x \\ x \end{array} \begin{array}{c} \nearrow -6 \\ \searrow 5 \end{array}$$

$$(x - 6)(x + 5) = 0$$

1) $x - 6 = 0 \rightarrow x = 6$

2) $x + 5 = 0 \rightarrow x = -5$

$$\therefore x = 6$$

b. $x(x + 1) = x^2 + 9$

$$x^2 + x = x^2 + 9$$

$$\therefore x = 9$$

c. $\frac{1}{x} = \frac{1}{36} + \frac{1}{45}$

$$\frac{1}{x} = \frac{9}{180}$$

$$\therefore x = 20$$

d. $x^2 + (x + 1)^2 = 3(x + 1) + 13$

$$x^2 + x^2 + 2x + 1 = 3x + 3 + 13$$

$$2x^2 - x - 15 = 0$$

$$\begin{array}{c} 2x \\ x \end{array} \begin{array}{c} \nearrow 5 \\ \searrow -3 \end{array}$$

$$(2x + 5)(x - 3) = 0$$

1) $2x + 5 = 0 \rightarrow x = -\frac{5}{2}$

2) $x - 3 = 0 \rightarrow x = 3$

Los números son: 3 y 4

$$\text{Suma} = 3 + 4 \rightarrow \text{suma} = 7$$

3. Resuelve los siguientes problemas de primer grado

a. $3x - 5 > 2(x + 7)$

$3x - 5 > 2x + 14$

$x > 19$

$CS = < 19 ; +\infty >$

b. $4x + 8 < 3(x - 9)$

$4x + 8 < 3x - 27$

$x < -35$

$CS = < -\infty ; -35 >$

c. $(x + 3)^2 - 2x \geq x^2$

$x^2 + 6x + 9 - 2x \geq x^2$

$4x \geq -9$

$x \geq -\frac{9}{4}$

$CS = \left[-\frac{9}{4} ; +\infty >$

d. $(x - 5)(x + 2) \leq x^2 - 7$

$x^2 - 3x - 10 \leq x^2 - 7$

$-3 \leq 3x \rightarrow x \geq -1$

$CS = [-1 ; +\infty >$

e. $2(x - 7)(x + 1) > (2x + 1)(x + 3)$

$2(x^2 - 6x - 7) > 2x^2 + 7x + 3$

$2x^2 - 12x - 14 > 2x^2 + 7x + 3$

$-17 > 19x$

$x < -\frac{17}{19}$

$CS = < -\infty ; -\frac{17}{19} >$

4. Resuelve las siguientes inecuaciones de segundo grado

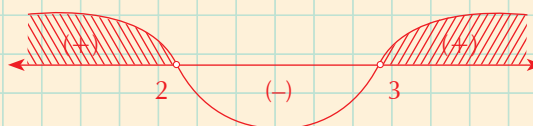
a. $x^2 - 5x + 6 > 0$

$$\begin{array}{c} x & \nearrow & -2 \\ x & \searrow & -3 \end{array}$$

$(x - 2)(x - 3) > 0$

1) $x - 2 = 0 \rightarrow x = 2$

2) $x - 3 = 0 \rightarrow x = 3$



$CS = < -\infty ; 2 > \cup < 3 ; +\infty >$

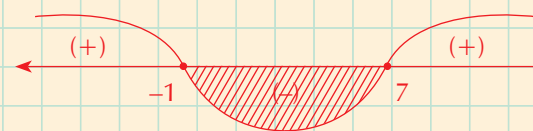
b. $x^2 - 6x - 7 \leq 0$

$$\begin{array}{c} x & \nearrow & -7 \\ x & \searrow & 1 \end{array}$$

$(x - 7)(x + 1) \leq 0$

1) $x - 7 = 0 \rightarrow x = 7$

2) $x + 1 = 0 \rightarrow x = -1$



$CS = [-1 ; 7]$

c. $2x(x + 9) + 40 \geq 0$

$2x^2 + 18x + 40 \geq 0$

$x^2 + 9x + 20 \geq 0$

$$\begin{array}{c} x & \nearrow & 4 \\ x & \searrow & 5 \end{array}$$

$(x + 4)(x + 5) \geq 0$

1) $x + 4 = 0 \rightarrow x = -4$

2) $x + 5 = 0 \rightarrow x = -5$



$CS = < -\infty ; -5] \cup [-4 ; +\infty >$

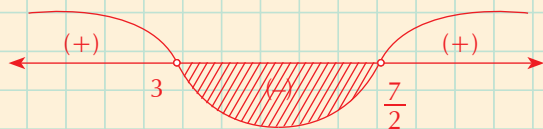
d) $2(x^2 + 11) < 13x + 1$
 $2x^2 + 22 < 13x + 1$
 $2x^2 - 13x + 21 < 0$

$$\begin{array}{c} 2x \\ x \end{array} \begin{array}{c} \uparrow \\ \times \\ \end{array} \begin{array}{c} -7 \\ -3 \end{array}$$

$$(2x - 7)(x - 3) < 0$$

1) $2x - 7 = 0 \rightarrow x = \frac{7}{2}$

2) $x - 3 = 0 \rightarrow x = 3$



$$CS = < 3; \frac{7}{2} >$$

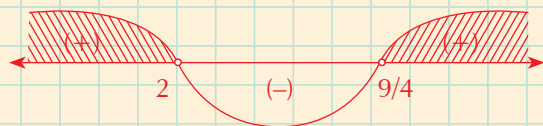
e) $2x^2 + 9 > \frac{17}{2}x$
 $4x^2 + 18 > 17x$
 $4x^2 - 17x + 18 > 0$

$$\begin{array}{c} 4x \\ x \end{array} \begin{array}{c} \uparrow \\ \times \\ \end{array} \begin{array}{c} -9 \\ -2 \end{array}$$

$$(4x - 9)(x - 2) > 0$$

1) $4x - 9 = 0 \rightarrow x = \frac{9}{4}$

2) $x - 2 = 0 \rightarrow x = 2$



$$CS = < -\infty; 2 > \cup < \frac{9}{4}; +\infty >$$

5. Resuelve las siguientes inecuaciones

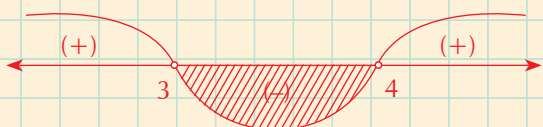
a) $y^2 + 12 - 7y < 0$
 $y^2 - 7y + 12 < 0$

$$\begin{array}{c} y \\ y \end{array} \begin{array}{c} \uparrow \\ \times \\ \end{array} \begin{array}{c} -4 \\ -3 \end{array}$$

$$(y - 4)(y - 3) < 0$$

1) $y - 4 = 0 \rightarrow y = 4$

2) $y - 3 = 0 \rightarrow y = 3$



$$CS = < 3; 4 >$$

b) $a^2 + 5a + 6 > 0$

$$\begin{array}{c} a \\ a \end{array} \begin{array}{c} \uparrow \\ \times \\ \end{array} \begin{array}{c} 3 \\ 2 \end{array}$$

$$(a + 3)(a + 2) > 0$$

1) $a + 3 = 0 \rightarrow a = -3$

2) $a + 2 = 0 \rightarrow a = -2$



$$CS = < -\infty; -3 > \cup < -2; +\infty >$$

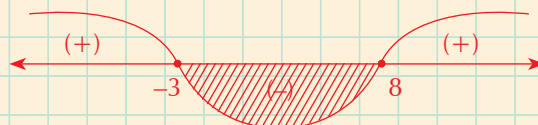
c) $m^2 - 5m - 24 \leq 0$

$$\begin{array}{c} m \\ m \end{array} \begin{array}{c} \uparrow \\ \times \\ \end{array} \begin{array}{c} -8 \\ 3 \end{array}$$

$$(m - 8)(m + 3) \leq 0$$

1) $m - 8 = 0 \rightarrow m = 8$

2) $m + 3 = 0 \rightarrow m = -3$



$$CS = [-3; 8]$$

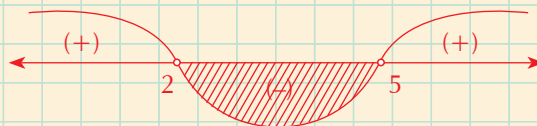
d) $y^2 - 7y + 10 \geq 0$

$$\begin{array}{c} y \\ y \end{array} \begin{array}{c} \uparrow \\ \times \\ \end{array} \begin{array}{c} -5 \\ -2 \end{array}$$

$$(y - 5)(y - 2) \geq 0$$

1) $y - 5 = 0 \rightarrow y = 5$

2) $y - 2 = 0 \rightarrow y = 2$



$$CS = < -\infty; 2 > \cup [5; +\infty >$$

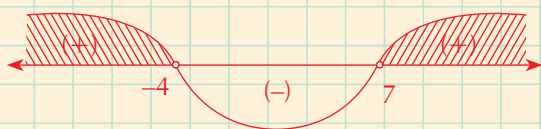
e) $y^2 - 3y - 28 > 0$

$$\begin{array}{r} y \\ y \end{array} \begin{array}{l} \nearrow -7 \\ \searrow 4 \end{array}$$

$$(y - 7)(y + 4) > 0$$

1) $y - 7 = 0 \rightarrow y = 7$

2) $y + 4 = 0 \rightarrow y = -4$



$$CS = <-\infty; -4> \cup <7; +\infty>$$

f) $5y - 8 < 4 + 4y$

$$5y - 8 - 4 - 4y < 0$$

$$y - 12 < 0$$

$$y < 12$$

$$CS = <-\infty; 12>$$

g) $5(1 + a) < 23 + 7a$

$$5 + 5a < 23 + 7a$$

$$2a > -18$$

$$a > -9$$

$$CS = <-9; +\infty>$$

h) $\frac{1}{3}(x - 5) - 2 \leq 1 - \frac{x}{4}$

$$\frac{x - 5 - 6}{3} \leq \frac{4 - x}{4}$$

$$4x - 44 \leq 12 - 3x$$

$$7x \leq 56$$

$$x \leq 8$$

$$CS = <-\infty; 8]$$

i) $3(y + 2) + 2 < 2(y - 1) + 1$

$$3y + 6 + 2 < 2y - 2 + 1$$

$$y < -9$$

$$CS = <-\infty; -9>$$

j) $2 - 3a + 6 > 8 + 2a - 2$

$$2 < 5a$$

$$a > \frac{2}{5}$$

$$CS = <\frac{2}{5}; +\infty>$$

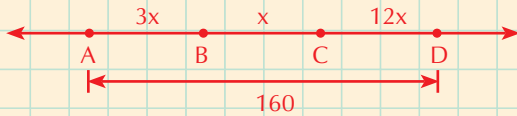
UNIDAD 6

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 1

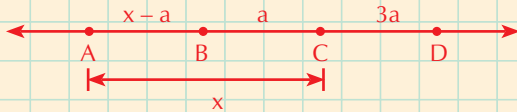


$$160 = 16x$$

$$x = 10$$

Rpta C

Resolución 2



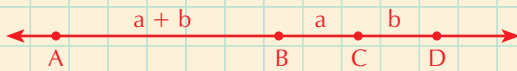
$$3AB + AD = 28$$

$$3(x-a) + x + 3a = 28$$

$$3x - 3a + x + 3a = 28$$

$$\therefore x = 7 \quad \text{Rpta A}$$

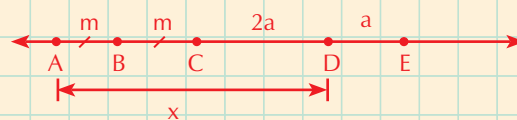
Resolución 3



$$\frac{AC - CD}{6BC} = \frac{2a + b - b}{6a}$$

$$\therefore \frac{AC - CD}{6BC} = \frac{1}{3} \quad \text{Rpta C}$$

Resolución 4



$$AB + AE = 24$$

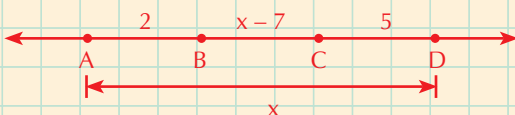
$$m + 2m + 3a = 24$$

$$m + a = 8$$

$$x = 2m + 2a = 2(m + a) = 2(8)$$

$$\therefore x = 16 \quad \text{Rpta E}$$

Resolución 5

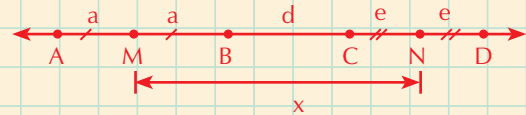


$$AC + BD + AD = 56$$

$$2 + x - 7 + x - 7 + 5 + x = 56$$

$$3x = 63 \quad \therefore x = 21 \quad \text{Rpta C}$$

Resolución 6



$$\left. \begin{array}{l} 2a + d = 28 \\ d + 2e = 30 \end{array} \right\} (+)$$

$$(2a + d + 2e) + d = 58$$

$$(42) + d = 58 \rightarrow d = 16$$

$$2a + 16 = 28 \rightarrow a = 6$$

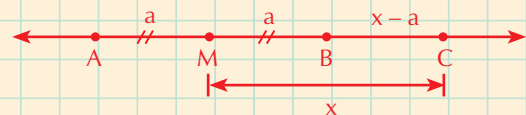
$$16 + 2e = 30 \rightarrow e = 7$$

$$x = a + d + e$$

$$x = 6 + 16 + 7$$

$$\therefore x = 29 \quad \text{Rpta B}$$

Resolución 7

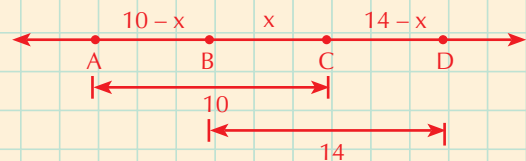


$$AC + BC = 40$$

$$a + x + x - a = 40$$

$$\therefore x = 20 \quad \text{Rpta D}$$

Resolución 8



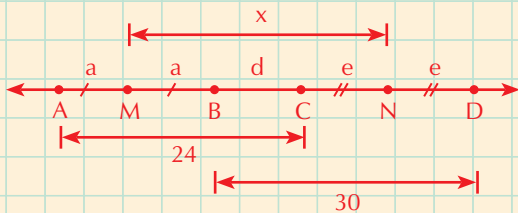
$$AD = 7BC$$

$$10 - x + x + 14 - x = 7x$$

$$24 = 8x$$

$$\therefore x = 3 \quad \text{Rpta C}$$

Resolución 9



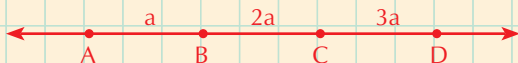
$$\begin{cases} 24 = 2a + d \\ 30 = d + 2e \end{cases} (+)$$

$$54 = 2a + 2d + 2e$$

$$27 = a + d + e$$

$$\therefore x = 27 \quad \text{Rpta B}$$

Resolución 10



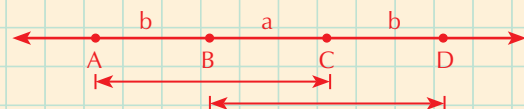
$$AB = \frac{BC}{2} = \frac{CD}{3} = a$$

$$M = \frac{AC^2 + BD^2}{BC^2} = \frac{(3a)^2 + (5a)^2}{(2a)^2}$$

$$M = \frac{34a^2}{4a^2}$$

$$\therefore M = 8,5 \quad \text{Rpta A}$$

Resolución 11



$$AD = 2BC$$

$$2b + a = 2 \cdot a \rightarrow a = 2b$$

$$\frac{CD}{BC} = \frac{b}{2b}$$

$$\therefore \frac{CD}{BC} = 0,5 \quad \text{Rpta C}$$

Resolución 12

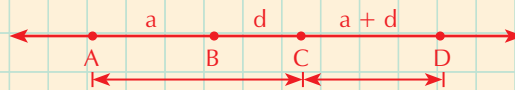


$$AB - BC = 28$$

$$2x + a - a = 28$$

$$\therefore x = 14 \quad \text{Rpta E}$$

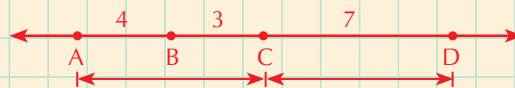
Resolución 13



$$\frac{BD - BA}{3BC} = \frac{2d + \cancel{a} - \cancel{a}}{3d}$$

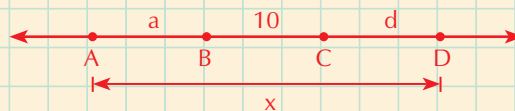
$$\therefore \frac{BD - BA}{3BC} = \frac{2}{3} \quad \text{Rpta B}$$

Resolución 14



$$\therefore BC = 3 \quad \text{Rpta C}$$

Resolución 15



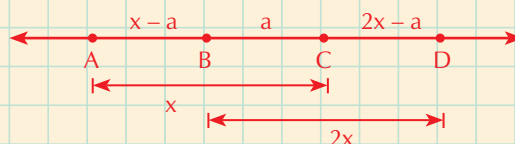
$$AC + BD = 32$$

$$a + 10 + 10 + d = 32$$

$$a + 10 + d = 22$$

$$\therefore x = 22 \quad \text{Rpta C}$$

Resolución 16

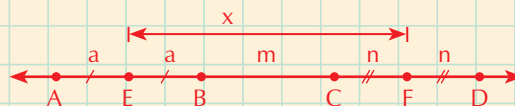


$$AD + BC = 12$$

$$x + 2x - a + a = 12$$

$$\therefore x = 4 \quad \text{Rpta D}$$

Resolución 17



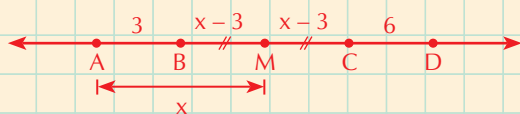
$$AC + BD = 34$$

$$2a + m + m + 2n = 34$$

$$a + m + n = 17$$

$$\therefore x = 17 \quad \text{Rpta B}$$

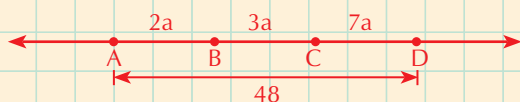
Resolución 18



$$\begin{aligned} BM \cdot MD &= 7 \\ (x-3)(x+3) &= 7 \\ x^2 - 9 &= 7 \end{aligned}$$

$$\therefore x = 4 \quad \text{Rpta. C}$$

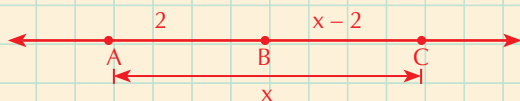
Resolución 19



$$\begin{aligned} \frac{AB}{2} &= \frac{BC}{3} = \frac{CD}{7} = a \\ 12a &= 48 \rightarrow a = 4 \\ AB &= 2a = 2 \cdot 4 \end{aligned}$$

$$\therefore AB = 8 \quad \text{Rpta. B}$$

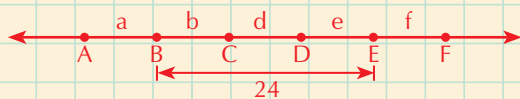
Resolución 20



$$\begin{aligned} AB \cdot BC &= 28 \\ 2(x-2) &= 28 \end{aligned}$$

$$\therefore x = 16 \quad \text{Rpta. D}$$

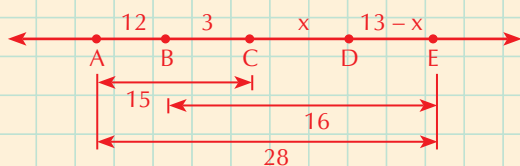
Resolución 21



$$\begin{aligned} AC + BD + CE + DF &= 46 \\ a + b + b + d + d + e + e + f &= 46 \\ (a + b + d + e + f) + (b + d + e) &= 46 \\ AF + 24 &= 46 \end{aligned}$$

$$\therefore AF = 22 \quad \text{Rpta. D}$$

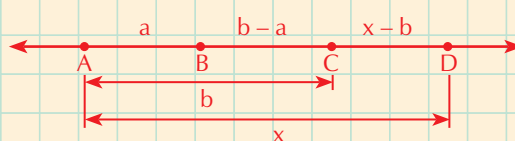
Resolución 22



$$\begin{aligned} BC &= 3 \cdot DE \\ 3 &= 3(13-x) \end{aligned}$$

$$\therefore x = 12 \quad \text{Rpta. A}$$

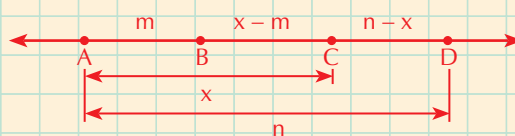
Resolución 23



$$\begin{aligned} 2(AC + BC) &= 3CD \\ 2(b + b - a) &= 3(x - b) \\ 4b - 2a &= 3x - 3b \end{aligned}$$

$$\therefore x = \frac{7b-2a}{3} \quad \text{Rpta. C}$$

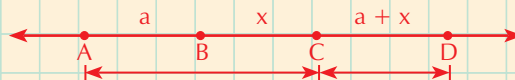
Resolución 24



$$\begin{aligned} AB \cdot CD &= BC \cdot AD \\ m(n-x) &= (x-m)n \\ m \cdot n - mx &= n \cdot x - m \cdot n \\ 2m \cdot n &= (m+n)x \end{aligned}$$

$$\therefore x = \frac{2m \cdot n}{m+n} \quad \text{Rpta. C}$$

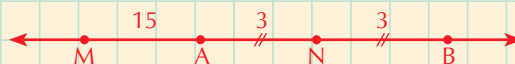
Resolución 25



$$\begin{aligned} BD - AB &= 4 \\ 2x + a - a &= 4 \end{aligned}$$

$$\therefore x = 2 \quad \text{Rpta. D}$$

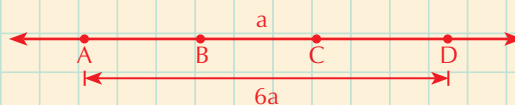
Resolución 26



$$\frac{MN}{NB} = \frac{18}{3}$$

$$\therefore \frac{MN}{NB} = 6 \quad \text{Rpta. A}$$

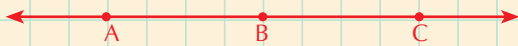
Resolución 27



$$\begin{aligned} AB + CD &= 40 \\ 6a - a &= 40 \rightarrow a = 8 \\ AD &= 6a = 6 \cdot 8 \end{aligned}$$

$$\therefore AD = 48 \quad \text{Rpta. D}$$

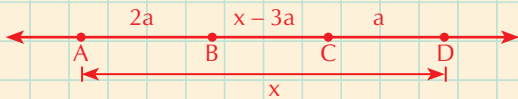
Resolución 28



$$\begin{aligned} 3(AC + AB) &= 4BC \\ 3(AB + BC + AB) &= 4BC \\ 6AB + 3BC &= 4BC \\ 6AB &= BC \end{aligned}$$

$$\therefore \frac{AB}{BC} = \frac{1}{6} \quad \text{Rpta. C}$$

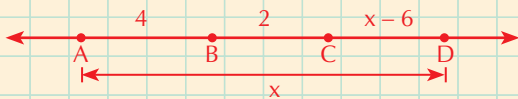
Resolución 29



$$\begin{aligned} 3AC - BC &= 20 \\ 3(2a + x - 3a) - (x - 3a) &= 20 \\ 3x - 3a - x + 3a &= 20 \end{aligned}$$

$$\therefore x = 10 \quad \text{Rpta. B}$$

Resolución 30



$$\begin{aligned} AB \cdot CD &= AD \cdot BC \\ 4(x - 6) &= x \cdot 2 \\ 4x - 24 &= 2x \end{aligned}$$

$$\therefore x = 12 \quad \text{Rpta. B}$$

Resolución 31



$$\begin{aligned} \frac{1}{AB} - \frac{1}{AC} &= \frac{2}{5} \\ \frac{1}{x} - \frac{1}{x+8} &= \frac{2}{5} \\ \frac{x+8-x}{x(x+8)} &= \frac{2}{5} \\ 40 &= 2x^2 + 16x \\ 20 &= x^2 + 8x \\ x^2 + 8x - 20 &= 0 \\ \begin{array}{l} x \quad \quad 10 \\ x \quad \quad -2 \end{array} \end{aligned}$$

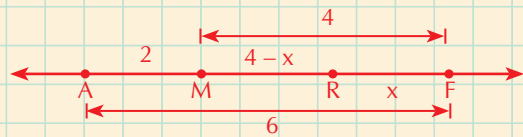
$$(x + 10)(x - 2) = 0$$

$$\text{I) } x + 10 = 0 \rightarrow x = -10$$

$$\text{II) } x - 2 = 0 \rightarrow x = 2$$

$$\therefore x = 2 \quad \text{Rpta. B}$$

Resolución 32



$$\begin{aligned} RF^2 &= AR \cdot MR \\ x^2 &= (6 - x)(4 - x) \\ x^2 &= 24 - 6x - 4x + x^2 \end{aligned}$$

$$\therefore x = 2,4 \quad \text{Rpta. D}$$

Aplica tus aprendizajes 2

Resolución 1

a) F

b) V

c) $5m \angle A + 4^\circ = m \angle C$

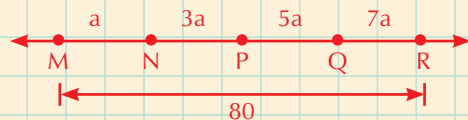
$$5 \times 28^\circ + 4^\circ = 144^\circ$$

$$144^\circ = 144^\circ$$

V

$$\therefore \text{FVV} \quad \text{Rpta. A}$$

Resolución 2



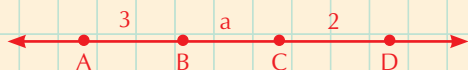
$$MN = \frac{NP}{3} = \frac{PQ}{5} = \frac{QR}{7} = a$$

$$16a = 80 \rightarrow a = 5$$

$$NQ = 8a = 8 \cdot 5$$

$$\therefore NQ = 40 \quad \text{Rpta. B}$$

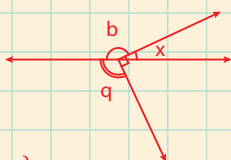
Resolución 3



$$\begin{aligned} 4BC + 5AD &= 88 \\ 4a + 5(5 + a) &= 88 \\ 4a + 25 + 5a &= 88 \rightarrow a = 7 \\ AC &= 3 + a = 3 + 7 = 10 \\ (AC)^2 &= 10^2 \end{aligned}$$

$$\therefore (AC)^2 = 100 \quad \text{Rpta B}$$

Resolución 4

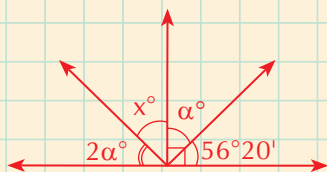


$$\left. \begin{aligned} \beta + \theta &= 270^\circ \\ \beta - \theta &= 40^\circ \end{aligned} \right\} (+)$$

$$\begin{aligned} 2\beta &= 310^\circ \rightarrow \beta = 155^\circ \\ \beta + x &= 180^\circ \\ 155^\circ + x &= 180^\circ \end{aligned}$$

$$\therefore x = 25^\circ \quad \text{Rpta A}$$

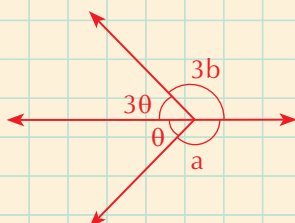
Resolución 5



$$\begin{aligned} 90^\circ &= \alpha + 56^\circ 20' \rightarrow \alpha = 33^\circ 40' \\ 2\alpha + x &= 90^\circ \\ 2(33^\circ 40') + x &= 90^\circ \\ 66^\circ 80' + x &= 90^\circ \\ 67^\circ 20' + x &= 90^\circ \end{aligned}$$

$$\therefore x = 22^\circ 40' \quad \text{Rpta B}$$

Resolución 6



$$\begin{aligned} 3\theta + 3b &= 180^\circ \rightarrow \theta = 60^\circ - b \\ \theta + a &= 180^\circ \end{aligned}$$

Reemplazando:

$$\begin{aligned} 60^\circ - b + a &= 180^\circ \\ a - b &= 120^\circ \\ a &= 120^\circ + b \end{aligned}$$

Del dato:

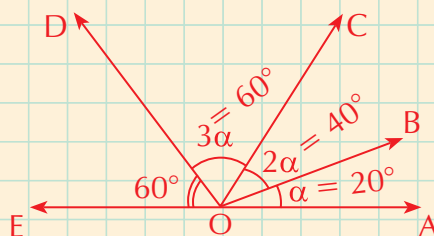
$$a + b = 156^\circ$$

Reemplazando:

$$120^\circ + b + b = 156^\circ$$

$$\therefore b = 18^\circ \quad \text{Rpta A}$$

Resolución 7



$$60^\circ + 6\alpha = 180^\circ \rightarrow \alpha = 20^\circ$$

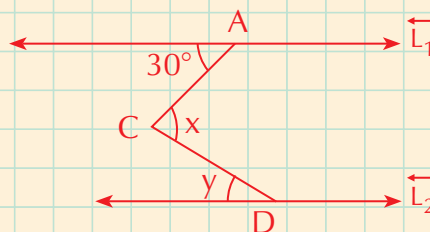
$m\angle AOB = m\angle DOE$ (Falso)

$m\angle AOD = 100^\circ$ (Falso)

$\overrightarrow{OD}$ es bisectriz del $\angle EOC$ (Verdadero)

$$\therefore \text{FFV} \quad \text{Rpta D}$$

Resolución 8



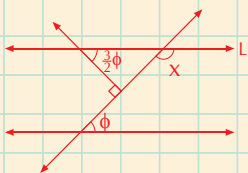
$$x + y = 60^\circ \text{ (Falso)}$$

$$x - y = 30^\circ \text{ (Verdadero)}$$

$$x + 150^\circ = 180^\circ \text{ (Falso)}$$

$$\therefore \text{FVF} \quad \text{Rpta B}$$

Resolución 9



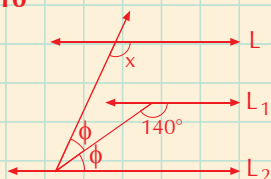
$$90^\circ = \phi + \frac{3}{2}\phi \rightarrow \phi = 36^\circ$$

$$\phi + x = 180^\circ$$

$$36^\circ + x = 180^\circ$$

$$\therefore x = 144^\circ \text{ Rpta. C}$$

Resolución 10



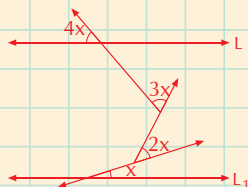
$$140^\circ + \phi = 180^\circ \rightarrow \phi = 40^\circ$$

$$2\phi + x = 180^\circ$$

$$2 \cdot 40^\circ + x = 180^\circ$$

$$\therefore x = 100^\circ \text{ Rpta. B}$$

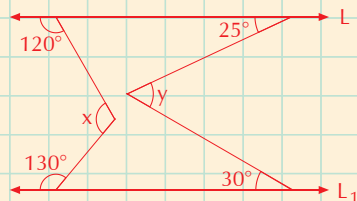
Resolución 11



$$x + 2x + 3x + 4x = 180^\circ$$

$$\therefore x = 18^\circ \text{ Rpta. C}$$

Resolución 12



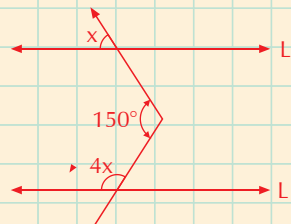
$$x = 50^\circ + 60^\circ = 110^\circ$$

$$y = 30^\circ + 25^\circ = 55^\circ$$

$$\frac{x}{y} = \frac{110^\circ}{55^\circ}$$

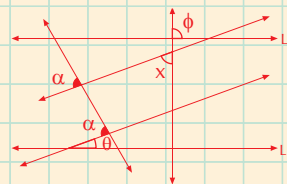
$$\therefore \frac{x}{y} = 2 \text{ Rpta. B}$$

Resolución 13



$$150^\circ = 180^\circ - 4x + x \therefore x = 10^\circ \text{ Rpta. D}$$

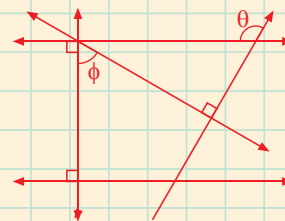
Resolución 14



$$\phi = \theta + x$$

$$\therefore x = \phi - \theta \text{ Rpta. D}$$

Resolución 15



$$\phi + \theta = 180^\circ$$

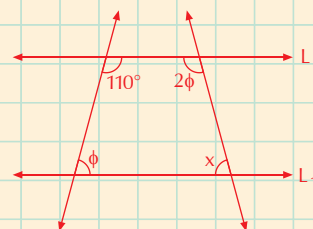
$$3x + 5^\circ + 6x + 10^\circ = 180^\circ \rightarrow x = \frac{165^\circ}{9}$$

$$\phi = 3x + 5^\circ$$

$$\phi = 3 \cdot \frac{165^\circ}{9} + 5^\circ$$

$$\therefore \phi = 60^\circ \text{ Rpta. D}$$

Resolución 16



$$\phi + 110^\circ = 180^\circ \rightarrow \phi = 70^\circ$$

$$x + 2\phi = 180^\circ$$

$$x + 2 \cdot 70^\circ = 180^\circ \therefore x = 40^\circ \text{ Rpta. B}$$

Aplica tus aprendizajes 3

Resolución 1

$$x + y = 90^\circ$$

$$x + 38^\circ 24' 52'' = 90^\circ$$

$$x = 89^\circ 59' 60'' - 38^\circ 24' 52''$$

$$\therefore x = 51^\circ 35' 8'' \quad \text{Rpta A}$$

Resolución 2

$$180^\circ - (90^\circ - x) = 124^\circ 34' 20''$$

$$90^\circ + x = 124^\circ 34' 20''$$

$$x = 124^\circ 34' 20'' - 90^\circ$$

$$x = 124^\circ 34' 20'' - 89^\circ 59' 60''$$

$$x = 123^\circ 93' 80'' - 89^\circ 59' 60''$$

$$\therefore x = 34^\circ 34' 20'' \quad \text{Rpta B}$$

Resolución 3

$$105^\circ 15' 25'' -$$

$$75^\circ 42' 37''$$

$$104^\circ 74' 85'' -$$

$$75^\circ 42' 37''$$

$$29^\circ 32' 48''$$

$$\therefore x = 29^\circ 32' 48'' \quad \text{Rpta B}$$

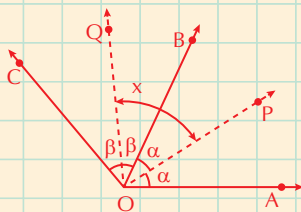
Resolución 4

$$x = 8(90^\circ - x) \rightarrow x = 80^\circ$$

$$S_{80^\circ} = 180^\circ - 80^\circ$$

$$\therefore S_{80^\circ} = 100^\circ \quad \text{Rpta D}$$

Resolución 5



$$x = \alpha + \beta \dots (1)$$

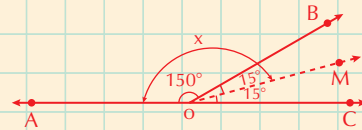
$$2\alpha + 2\beta = 130^\circ$$

$$\alpha + \beta = 65^\circ$$

En (1):

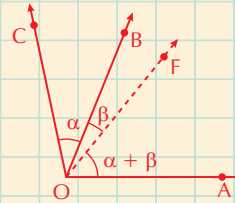
$$\therefore x = 65^\circ \quad \text{Rpta C}$$

Resolución 6



$$\therefore x = 165^\circ \quad \text{Rpta A}$$

Resolución 7



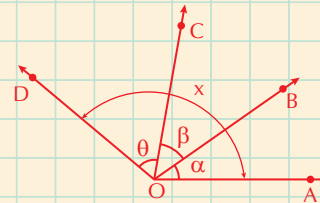
$$m \angle AOB - m \angle BOC = 34^\circ$$

$$\alpha + 2\beta - \alpha = 34^\circ$$

$$2\beta = 34^\circ$$

$$\therefore \beta = 17^\circ \quad \text{Rpta D}$$

Resolución 8



$$m \angle AOC + m \angle BOD = 200^\circ$$

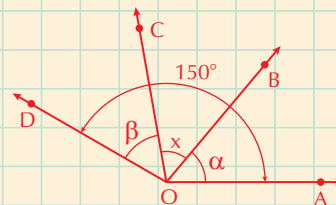
$$\alpha + \beta + \beta + \theta = 200^\circ$$

$$\alpha + \beta + \theta + \beta = 200^\circ$$

$$x + \frac{3}{7}x = 200^\circ$$

$$\therefore x = 140^\circ \quad \text{Rpta E}$$

Resolución 9



$$m \angle AOC + m \angle BOD = 200^\circ$$

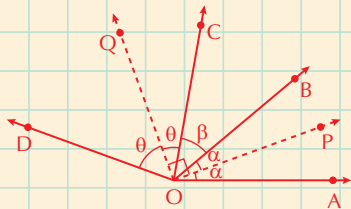
$$\alpha + x + x + \beta = 200^\circ$$

$$\alpha + x + \beta + x = 200^\circ$$

$$150^\circ + x = 200^\circ$$

$$\therefore x = 50^\circ \quad \text{Rpta C}$$

Resolución 10



$$m \angle AOC + m \angle BOD = 2\alpha + \beta + \beta + 2\theta$$

$$m \angle AOC + m \angle BOD = 2(\alpha + \beta + \theta) = 2(90^\circ)$$

$$\therefore m \angle AOC + m \angle BOD = 180^\circ \quad \text{Rpta. E}$$

Resolución 11

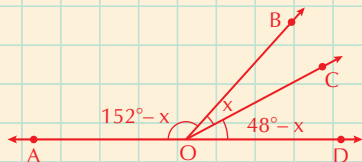
$$180^\circ - [86^\circ 35' 25'' - 25^\circ 59' 45''] \div 5$$

$$180^\circ - [60^\circ 35' 40''] \div 5$$

$$180^\circ - 12^\circ 7' 8''$$

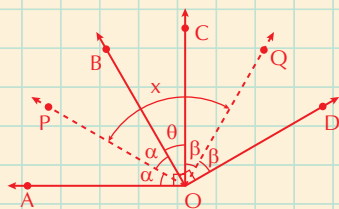
$$\therefore 167^\circ 52' 52'' \quad \text{Rpta. A}$$

Resolución 12



$$\therefore x = 20^\circ \quad \text{Rpta. C}$$

Resolución 13



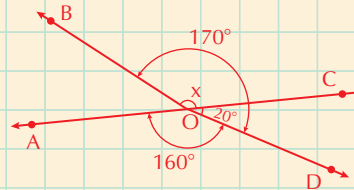
$$\left. \begin{array}{l} 2\alpha + \theta = 90^\circ \\ \theta + 2\beta = 90^\circ \end{array} \right\} (+)$$

$$2\alpha + 2\theta + 2\beta = 180^\circ$$

$$\alpha + \theta + \beta = 90^\circ$$

$$\therefore x = 90^\circ \quad \text{Rpta. D}$$

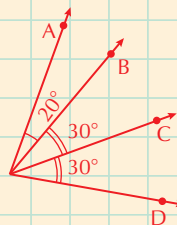
Resolución 14



$$x + 20^\circ = 170^\circ$$

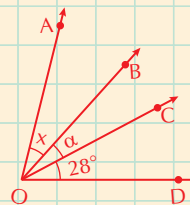
$$\therefore x = 150^\circ \quad \text{Rpta. D}$$

Resolución 15



$$\therefore m \angle AOC = 50^\circ \quad \text{Rpta. D}$$

Resolución 16



$$m \angle AOB \cdot m \angle BOD = m \angle AOC \cdot m \angle COD$$

$$x \cdot (\alpha + 28^\circ) = (x + \alpha) \cdot 28^\circ$$

$$\alpha x + 28^\circ x = 28^\circ x + 28^\circ \alpha$$

$$\alpha x = 28^\circ \alpha$$

$$\therefore x = 28^\circ \quad \text{Rpta. B}$$

Resolución 17

$$x - (90^\circ - x) = \frac{1}{4}(180^\circ - x)$$

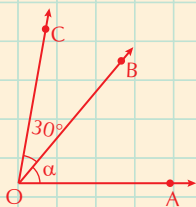
$$4 \cdot (2x - 90^\circ) = 180^\circ - x$$

$$8x - 360^\circ = 180^\circ - x$$

$$9x = 540^\circ$$

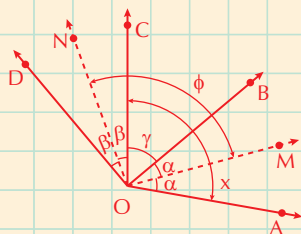
$$\therefore x = 60^\circ \quad \text{Rpta. D}$$

Resolución 18



$$\alpha + 30^\circ = 180^\circ - 2\alpha \quad \therefore \quad \alpha = 50^\circ \quad \text{Rpta. A}$$

Resolución 19



$$m \angle AOC - m \angle BOD = \theta$$

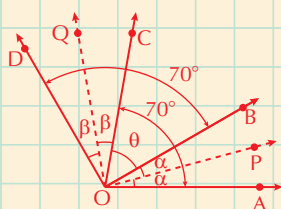
$$2\alpha + \gamma - (\gamma + 2\beta) = \theta$$

$$2\alpha + \gamma - \gamma - 2\beta = \theta$$

$$\left. \begin{array}{l} \alpha - \beta = \frac{\theta}{2} \\ \alpha + \gamma + \beta = \phi \end{array} \right\} (+)$$

$$2\alpha + \gamma = \frac{\theta}{2} + \phi \quad \therefore \quad x = \frac{\theta}{2} + \phi \quad \text{Rpta. A}$$

Resolución 20



$$m \angle POQ = \alpha + \theta + \beta \dots (1)$$

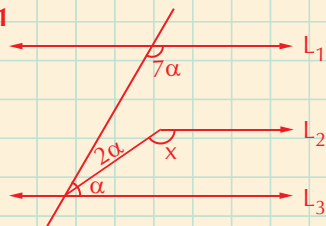
$$\left. \begin{array}{l} 70^\circ = 2\alpha + \theta \\ 70^\circ = \theta + 2\beta \end{array} \right\} (+)$$

$$140^\circ = 2(\alpha + \theta + \beta)$$

$$\alpha + \theta + \beta = 70^\circ \dots (2)$$

$$\text{De (1) y (2):} \quad \therefore \quad m \angle POQ = 70^\circ \quad \text{Rpta. C}$$

Resolución 21

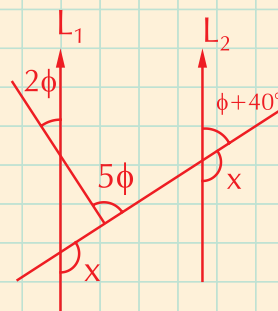


$$7\alpha + 3\alpha = 180^\circ \rightarrow \alpha = 18^\circ$$

$$x + \alpha = 180^\circ \rightarrow x + 18^\circ = 180^\circ$$

$$\therefore \quad x = 162^\circ \quad \text{Rpta. A}$$

Resolución 22

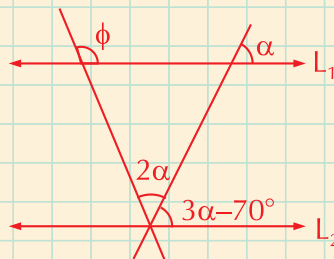


$$5\phi = 2\phi + \phi + 40^\circ \rightarrow \phi = 20^\circ$$

$$x + \phi + 40^\circ = 180^\circ \rightarrow x + 20^\circ + 40^\circ = 180^\circ$$

$$\therefore \quad x = 120^\circ \quad \text{Rpta. E}$$

Resolución 23

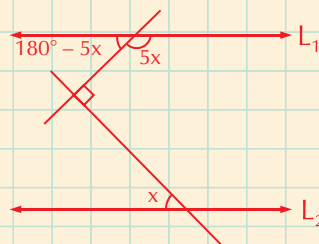


$$\alpha = 3\alpha - 70^\circ \rightarrow \alpha = 35^\circ$$

$$\phi = 5\alpha - 70^\circ = 5 \cdot 35^\circ - 70^\circ$$

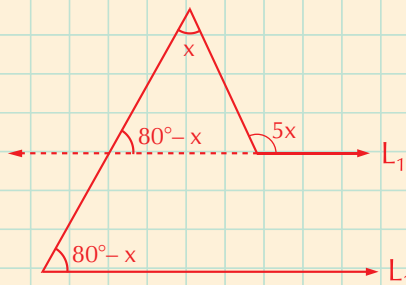
$$\therefore \quad \phi = 105^\circ \quad \text{Rpta. B}$$

Resolución 24



$$90^\circ = x + 180^\circ - 5x \quad \therefore \quad x = 22^\circ 30' \quad \text{Rpta. D}$$

Resolución 25



$$5x = 80^\circ - x + x$$

$$\therefore \quad x = 16^\circ \quad \text{Rpta. C}$$

Aplica tus aprendizajes 4

Resolución 1

$$6 - 5 < x < 6 + 5$$

$$1 < x < 11$$

$$x = 2; 3; 4; \dots; 10$$

Menor valor entero de x es 2.

Rpta. B

Resolución 2

$$15 - 8 < x < 15 + 8$$

$$7 < x < 23$$

$$x = 8; 9; 10; \dots; 22$$

El mayor valor entero de x es 22.

Rpta. C

Resolución 3

$$2x + 2 = \frac{10}{2}$$

$$2x + 2 = 5$$

$$2x = 3$$

$$\therefore x = 1,5 \text{ cm}$$

Rpta. A

Resolución 4

$$2\phi + 90^\circ = 132^\circ$$

$$2\phi = 42^\circ$$

$$\phi = 21^\circ$$

$$\rightarrow \alpha = 90^\circ + \phi$$

$$\alpha = 90^\circ + 21^\circ$$

$$\therefore \alpha = 111^\circ$$

Rpta. A

Resolución 5

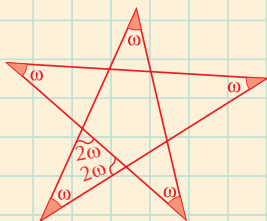
$$x = 90^\circ + \frac{58^\circ}{2}$$

$$x = 90^\circ + 29^\circ$$

$$\therefore x = 119^\circ \text{ cm}$$

Rpta. A

Resolución 6



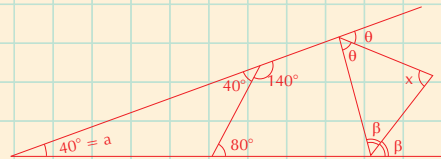
$$w + 2w + 2w = 180^\circ$$

$$5w = 180^\circ$$

$$\therefore w = 36^\circ$$

Rpta. D

Resolución 7



$$x = 90^\circ - \frac{a}{2}$$

$$x = 90^\circ - \frac{40^\circ}{2}$$

$$x = 90^\circ - 20^\circ$$

$$\therefore x = 70^\circ \text{ cm}$$

Rpta. A

Resolución 8

$$\Delta \text{ pequeño: } 3x + \alpha + \phi = 180^\circ \dots (1)$$

$$\Delta \text{ grande: } 3\phi + 3\alpha = 360^\circ$$

$$3\phi + 3\alpha + 180^\circ - x = 360^\circ$$

$$3\phi + 3\alpha = 180^\circ + x$$

$$\phi + \alpha = 60^\circ + \frac{x}{3} \dots (2)$$

$$(2) \text{ en } (1): 3x + 60^\circ + \frac{x}{3} = 180^\circ$$

$$\therefore x = 36^\circ$$

Rpta. E

Resolución 9



$$40^\circ + 40^\circ = 4\alpha$$

$$40^\circ = 4(\alpha - \theta)$$

$$\Rightarrow \alpha - \theta = 10^\circ \dots (1)$$

$$\text{Además: } 3\theta + x = 3\alpha$$

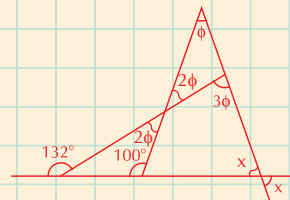
$$x = 3(\alpha - \theta) \dots (2)$$

$$(1) \text{ en } (2): x = 3(10^\circ)$$

$$\therefore x = 30^\circ \text{ cm}$$

Rpta. B

Resolución 10



$$\text{I) } 100^\circ + 2\phi = 132^\circ$$

$$\phi = 16^\circ$$

$$\text{II) Además: } x + \phi = 100^\circ$$

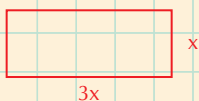
$$\Rightarrow x + 16^\circ = 100^\circ$$

$$x = 84^\circ$$

Rpta. B

Aplica tus aprendizajes 5

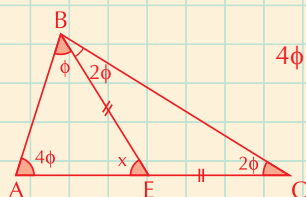
Resolución 1



$$\begin{aligned} 8x &= 880 \text{ m} \\ x &= 110 \text{ m} \\ \rightarrow 3x &= 330 \text{ m} \end{aligned}$$

$\therefore$ El largo mide 330 m Rpta. A

Resolución 2



$$\begin{aligned} 4\phi + \phi + 2\phi + 2\phi &= 180^\circ \\ 9\phi &= 180^\circ \\ \phi &= 20^\circ \end{aligned}$$

$$\begin{aligned} x &= 2\phi + 2\phi \\ x &= 4\phi = 4(20^\circ) \Rightarrow x = 80^\circ \end{aligned}$$

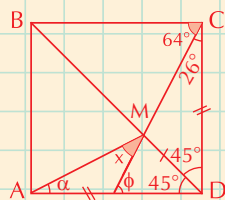
Rpta. A

Resolución 3

$$\begin{aligned} m\angle C &= m\angle A \\ 2\alpha - 32^\circ &= \alpha + 12^\circ \\ \alpha &= 44^\circ \\ m\angle A &= 2(44^\circ) - 32^\circ = 56^\circ \\ m\angle B &= 180^\circ - 56^\circ \Rightarrow m\angle B = 124^\circ \end{aligned}$$

Rpta. E

Resolución 4



$$\begin{aligned} \triangle ADM &\cong \triangle MDC \\ (\text{LAL}) \\ \Rightarrow \alpha &= 26^\circ \end{aligned}$$

$$\text{Como } \alpha + x = \phi$$

$$\begin{aligned} \Rightarrow 26^\circ + x &= 90^\circ - 26^\circ \\ 26^\circ + x &= 64^\circ \end{aligned}$$

$$x = 64^\circ - 26^\circ \Rightarrow x = 38^\circ \text{ Rpta. B}$$

Resolución 5

$$d = l\sqrt{2}$$

$$d = 12\sqrt{2} \cdot \sqrt{2} \Rightarrow d = 24 \text{ cm Rpta. E}$$

Resolución 6

$$\begin{aligned} 3\phi + 20^\circ &= 5\phi \\ 20^\circ &= 2\phi \Rightarrow \phi = 10^\circ \\ x + 3\phi + 20^\circ &= 180^\circ \\ x + 3(10^\circ) + 20^\circ &= 180^\circ \\ x + 30^\circ + 20^\circ &= 180^\circ \Rightarrow x = 130^\circ \end{aligned}$$

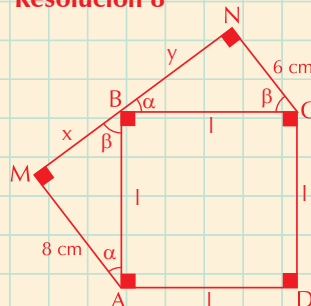
Rpta. C

Resolución 7

$$\begin{aligned} 2(3x + 2x) &= 120 \text{ cm} \\ 3x + 2x &= 60 \text{ cm} \Rightarrow x = 12 \text{ cm} \\ \text{Además } 2y - 2 &= 3x \\ 2y - 2 &= 36 \text{ cm} \\ y &= 19 \text{ cm} \\ x + y &= 12 \text{ cm} + 19 \text{ cm} \\ \therefore x + y &= 31 \text{ cm} \end{aligned}$$

Rpta. B

Resolución 8



$$\triangle AMB \cong \triangle DNC \quad (\text{ALA})$$

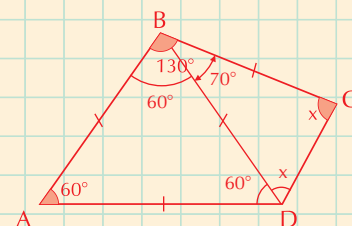
$$\begin{aligned} x &= 6 \text{ cm} \\ y &= 8 \text{ cm} \end{aligned}$$

$$\begin{aligned} MN &= x + y = 6 + 8 \\ MN &= 14 \text{ cm} \end{aligned}$$

Rpta. D

Resolución 9

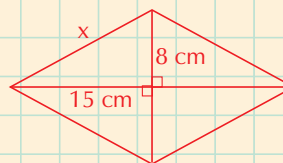
Se traza la diagonal BD y se forma el $\triangle$ equilátero ABD.



En el $\triangle$ isósceles DBC : $2x + 70^\circ = 180^\circ$

$$\therefore x = 55^\circ \text{ Rpta. C}$$

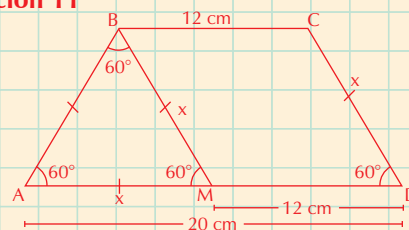
Resolución 10



$$\begin{aligned} x^2 &= 15^2 + 8^2 \\ x^2 &= 289 \\ x &= 17 \end{aligned}$$

Rpta. E

Resolución 11



Se traza la paralela BM a $\overline{CD}$;
se forma el $\triangle$ equilátero ABM y $MD = 12 \text{ cm}$

Se observa que:

$$\begin{aligned} x + 12 \text{ cm} &= 20 \text{ cm} \\ x &= 8 \text{ cm} \end{aligned}$$

$$\Rightarrow AB + CD = 8 \text{ cm} + 8 \text{ cm} = 16 \text{ cm}$$

Rpta. A

Aplica tus aprendizajes 6

Resolución 2

Por propiedad:

$$3x + 20^\circ = x + 60^\circ$$

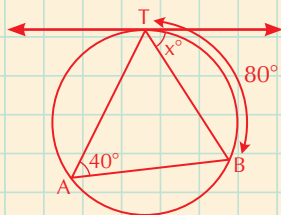
$$2x = 40^\circ \Rightarrow \boxed{x = 20^\circ}$$

Luego:

$$\begin{aligned}\widehat{EM} &= 3x + 20^\circ \\ &= 3 \cdot 20^\circ + 20^\circ \\ &= 80^\circ\end{aligned}$$

Rpta. A

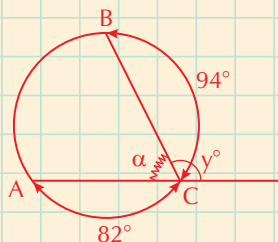
Resolución 3



Por propiedad: $x = \frac{80^\circ}{2}$
 $x = 40^\circ$

Rpta. A

Resolución 4



$$m\widehat{AB} = 360^\circ - (82^\circ + 94^\circ)$$

$$m\widehat{AB} = 184^\circ$$

Como $\alpha = \frac{m\widehat{AB}}{2} \Rightarrow \alpha = \frac{184^\circ}{2}$

$$\alpha = 92^\circ$$

Además: $\alpha + y^\circ = 180^\circ$

$$92^\circ + y^\circ = 180^\circ$$

$$y^\circ = 88^\circ$$

Rpta. A

Resolución 5

Por propiedad:

$$\frac{160^\circ - 40^\circ}{2} = \alpha^\circ$$

$$\alpha^\circ = 60^\circ$$

Rpta. B

Resolución 6

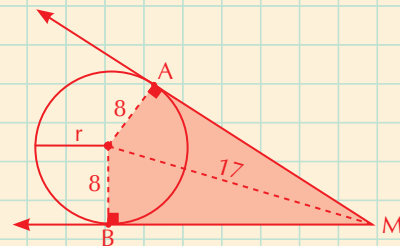
Por propiedad:

$$4a + 3 = 15$$

$$4a = 12 \Rightarrow \boxed{a = 3}$$

Rpta. C

Resolución 7



En el $\triangle OBM$:

Por el teorema de Pitágoras:

$$\overline{OM}^2 = \overline{OB}^2 + \overline{MB}^2$$

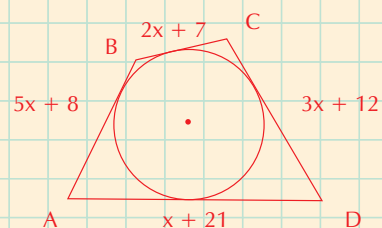
$$17^2 = 8^2 + \overline{MB}^2$$

$$\boxed{\overline{MB} = 15 \text{ cm}}$$

Luego $\frac{MB}{3} = \frac{15 \text{ cm}}{3} = \boxed{5 \text{ cm}}$

Rpta. A

Resolución 8



Por propiedad:

$$5x + 8 + 3x + 12 = 2x + 7 + x + 21$$

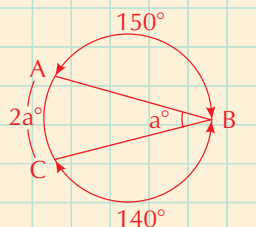
$$\boxed{5x = 8}$$

Luego: $AB = 5x + 8 = 8 + 8 = \boxed{16}$

Rpta. D

Aplica tus aprendizajes 7

Resolución 1



Del gráfico:

$$2a^\circ + 150^\circ + 140^\circ = 360^\circ$$

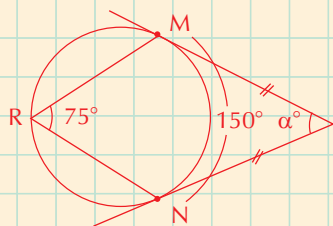
$$2a^\circ = 70^\circ$$

$$a^\circ = 35^\circ$$

Luego: $a^\circ + 35^\circ = 35^\circ + 35^\circ = 70^\circ$

Rpta. A

Resolución 2



Del gráfico:

$$m\widehat{MRN} + 150^\circ = 360^\circ$$

$$\Rightarrow m\widehat{MRN} = 210^\circ$$

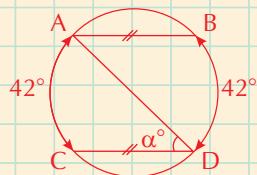
Por propiedad: $\frac{m\widehat{MRN} - 150^\circ}{2} = \alpha^\circ$

$$\Rightarrow \frac{210^\circ - 150^\circ}{2} = \alpha^\circ$$

$$\alpha^\circ = 30^\circ$$

Rpta. B

Resolución 3



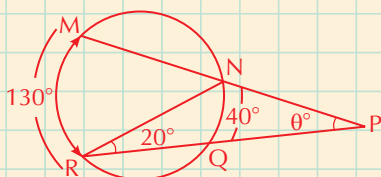
$$\alpha^\circ = \frac{42^\circ}{2}$$

$$\Rightarrow \alpha^\circ = 21^\circ$$

$$\frac{\alpha^\circ}{3} = 7^\circ$$

Rpta. B

Resolución 4



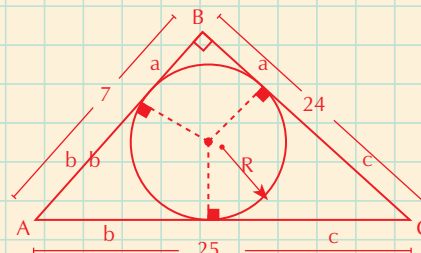
Del gráfico:

Por propiedad: $\frac{130^\circ - 40^\circ}{2} = \theta^\circ$

$$45^\circ = \theta^\circ$$

Rpta. D

Resolución 5



Del gráfico: $A = R \dots (\alpha)$

$$\begin{cases} a + b = 7 & (I) \\ a + c = 24 & (II) \\ b + c = 25 & (III) \end{cases}$$

$$\Sigma \text{MAM } 2(a + b + c) = 56$$

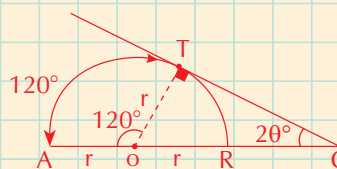
$$a + b + c = 28$$

$$\downarrow R + 25 = 28 \Rightarrow R = 3$$

Luego $R^2 = 3^2 = 9$

Rpta. B

Resolución 6

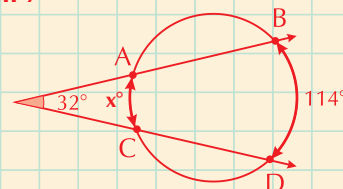


En el $\triangle OBM$: $20^\circ + 90^\circ = 120^\circ$

$$\theta^\circ = 15^\circ$$

Rpta. A

Resolución 7

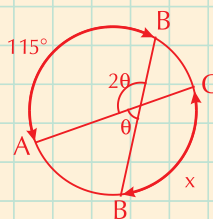


Por propiedad $\frac{114^\circ - x^\circ}{2} = 32^\circ$

$$x^\circ = 50^\circ$$

Rpta. B

Resolución 8



Del Gráfico:

$$\theta + 20^\circ = 180^\circ$$

$$\theta = 60^\circ$$

Por propiedad: $\frac{115^\circ + x}{2} = 20^\circ$

$$115^\circ + x = 240^\circ$$

$$x = 125^\circ$$

$$m\widehat{BC} = x = 125^\circ$$

Rpta. A

UNIDAD 7

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 1

$$12 \text{ km} = 12\,000 \text{ m} = 1\,200\,000 \text{ cm}$$

$$\therefore 12 \text{ km} = 12 \times 10^5 \text{ cm}$$

Rpta. C

Resolución 2

$$0,125 \text{ km} = 0,125 \times 10^5 \text{ cm}$$

$$0,125 \text{ km} = 12\,500 \text{ cm}$$

$$\therefore 0,125 \text{ km} = 125 \times 10^2 \text{ cm}$$

Rpta. B

Resolución 3

$$5 \text{ km } 4 \text{ hm} = 5\,000 \text{ m} + 400 \text{ m}$$

$$\therefore 5 \text{ km } 4 \text{ hm} = 5\,400 \text{ m}$$

Rpta. D

Resolución 4

$$1 \text{ Mm}^2 = 10^{12} \text{ m}^2$$

$$1 \text{ km}^2 = 10^6 \text{ m}^2$$

$$\frac{1 \text{ Mm}^2}{1 \text{ km}^2} = \frac{10^{12}}{10^6} = 10^{12-6} = 10^6$$

$$\Rightarrow 1 \text{ Mm}^2 = 10^6 \text{ km}^2$$

$$\therefore 16 \text{ Mm}^2 = 16 \times 10^6 \text{ km}^2$$

Rpta. A

Resolución 5

$$1 \text{ hm}^3 = 10^6 \text{ m}^3$$

$$1 \text{ m}^3 = \frac{1}{10^6} \text{ hm}^3$$

$$\Rightarrow 8 \text{ m}^3 = 8 \times \frac{1}{10^6} \text{ hm}^3$$

$$\therefore 8 \text{ m}^3 = 8 \times 10^{-6} \text{ hm}^3$$

Rpta. C

Resolución 6

$$1 \text{ m}^2 = 100 \text{ dm}^2$$

$$1 \text{ dm}^2 = \frac{1}{100} \text{ m}^2$$

$$\Rightarrow 500 \text{ dm}^2 = 500 \times \frac{1}{100} \text{ m}^2$$

$$\therefore 500 \text{ dm}^2 = 5 \text{ m}^2$$

Rpta. E

Resolución 7

$$1 \text{ ha} = 10\,000 \text{ m}^2$$

$$1 \text{ m}^2 = \frac{1}{10\,000} \text{ ha}$$

$$\Rightarrow 900 \text{ m}^2 = 900 \times \frac{1}{10\,000} \text{ ha}$$

$$900 \text{ m}^2 = \frac{9}{100} \text{ ha}$$

$$\therefore 900 \text{ m}^2 = 9 \times 10^{-2} \text{ ha}$$

Rpta. B

Resolución 8

$$(85 \text{ m}^3) \cdot 4 + (15 \text{ m}^3) \cdot 6$$

$$= 340 \text{ m}^3 + 90 \text{ m}^3$$

$$= 430 \text{ m}^3$$

Rpta. B

Resolución 9

$$240 \text{ mm}^2 + \boxed{} \text{ mm}^2 = 264 \cdot 10^{-6} \text{ m}^2$$

$$\text{pero } 1 \text{ m}^2 = 10^6 \text{ mm}^2$$

$$\text{y } 264 \cdot 10^{-6} \text{ m}^2 = 264 \cdot 10^{-6} \cdot 10^6 \text{ mm}^2$$

$$\Rightarrow 264 \cdot 10^{-6} \text{ m}^2 = 264 \cdot 10^{-6+6} \text{ mm}^2$$

$$= 264 \cdot 10^0 \text{ mm}^2 = 264 \text{ mm}^2$$

$$240 \text{ mm}^2 + \boxed{} \text{ mm}^2 = 264 \text{ mm}^2$$

$$\text{Rpta. En el recuadro debe ir } 24 \text{ mm}^2$$

Rpta. D

Resolución 10

$$1 \text{ km}^3 = 10^9 \text{ m}^3$$

$$1 \text{ m}^3 = \frac{1}{10^9} \text{ km}^3$$

$$\Rightarrow 15 \cdot 10^9 \text{ m}^3 = 15 \cdot 10^9 \cdot \frac{1}{10^9} \text{ km}^3$$

$$\therefore 15 \cdot 10^9 \text{ m}^3 = 15 \text{ km}^3$$

$$3 \cdot (3 \text{ km}^3) + 2 \cdot \boxed{} = 15 \text{ km}^3$$

$$9 \text{ km}^3 + 2 \cdot \boxed{} = 15 \text{ km}^3$$

$$\uparrow$$

$$3 \text{ km}^3$$

$$\text{Rpta. En el recuadro debe ir } 3 \text{ km}^3 \text{ ó } 3 \cdot 10^9 \text{ m}^3$$

Rpta. C

Resolución 11

$$L = 4 \text{ m } 5 \text{ d m} = 400 \text{ cm } 50 \text{ cm}$$

$$L = 450 \text{ cm}$$

$$\text{Perímetro} = 4L = 4(450 \text{ cm}) = 1\,800 \text{ cm}$$

Rpta. A

Resolución 12

$$1 \text{ ca} = 1 \text{ m}^2$$

$$1 \text{ m}^2 \rightarrow \text{S/. } 28$$

$$32 \text{ m}^2 \rightarrow x$$

$$x = \frac{32 \text{ m}^2 \cdot \text{S/. } 28}{1 \text{ m}^2} = \text{S/. } 896$$

$$\text{Rpta. } 32 \text{ ca cuestan S/. } 896$$

Rpta. C

Resolución 13

$$A = \pi (R^2 - r^2) = \pi [(6 \text{ cm})^2 - (3 \text{ cm})^2]$$

$$A = \pi [36 \text{ cm}^2 - 9 \text{ cm}^2] = \pi [27 \text{ cm}^2]$$

$$\therefore A = 27\pi \text{ cm}^2$$

Rpta. D

Resolución 14

$$\text{I. } 3 \text{ m}^2 = 3\,000 \text{ cm}^2 \dots\dots\dots (\text{F})$$

$$\text{II. } 2 \text{ ha} = 20\,000 \text{ m}^2 \dots\dots\dots (\text{V})$$

$$\text{III. } 5 \text{ cm} = 5 \times 10^6 \text{ nm} \dots\dots\dots (\text{F})$$

$$\text{IV. } 29 \mu\text{m} = 5,8 \text{ mm} \dots\dots\dots (\text{F})$$

$$\text{V. } 6 \text{ km}^2 = 6 \times 10^6 \text{ m}^2 \dots\dots\dots (\text{V})$$

$$\Rightarrow \text{FVFFV}$$

Rpta. B

Resolución 15

$$\text{I. } 5 \text{ m}$$

$$\text{(III) } 5 \times 10^{-4} \text{ cm}$$

$$\text{II. } 5 \text{ mm}$$

$$\text{(I) } 5 \times 10^2 \text{ cm}$$

$$\text{III. } 5 \mu\text{m}$$

$$\text{(II) } 5 \times 10^{-1} \text{ cm}$$

$$\Rightarrow \text{III, I, II}$$

Rpta. D

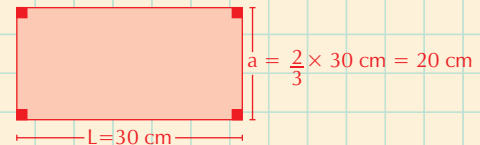
Aplica tus aprendizajes 2

Resolución 1

VVFFV

Rpta. D

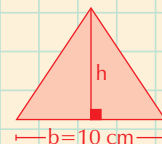
Resolución 2



$$\begin{aligned} \text{Área}_{\square} &= L \times a \\ &= 30 \text{ cm} \times 20 \text{ cm} \\ &= 600 \text{ cm}^2 \end{aligned}$$

Rpta. D

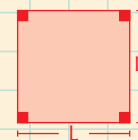
Resolución 3



$$\begin{aligned} \text{Área}_{\triangle} &= \frac{b \times h}{2} \\ 40 \text{ cm}^2 &= \frac{10 \text{ cm} \times h}{2} \\ h &= 8 \text{ cm} \end{aligned}$$

Rpta. C

Resolución 4



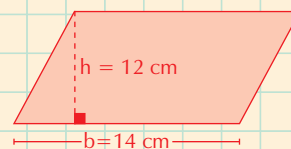
$$\begin{aligned} \text{Perímetro}_{\square} &= 4L \\ 32 \text{ cm} &= 4L \Rightarrow L = 8 \text{ cm} \end{aligned}$$

Luego:

$$\begin{aligned} \text{Área}_{\square} &= L^2 = (8 \text{ cm})^2 \\ &= 64 \text{ cm}^2 \end{aligned}$$

Rpta. A

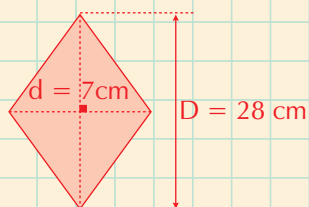
Resolución 5



$$\begin{aligned} \text{Área}_{\square} &= b \times h \\ &= 14 \text{ cm} \times 12 \text{ cm} \\ &= 168 \text{ cm}^2 \end{aligned}$$

Rpta. C

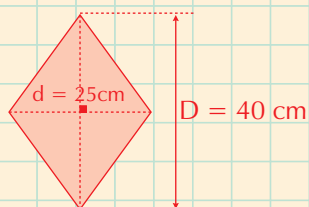
Resolución 6



$$\begin{aligned}\text{Área } \diamond &= \frac{D \cdot d}{2} \\ &= \frac{28 \text{ cm} \times 7 \text{ cm}}{2} \\ &= 98 \text{ cm}^2\end{aligned}$$

Rpta. B

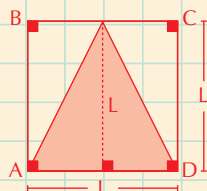
Resolución 7



$$\begin{aligned}\text{Área } \diamond &= \frac{D \cdot d}{2} \\ &= \frac{40 \text{ cm} \times 25 \text{ cm}}{2} \\ &= 500 \text{ cm}^2\end{aligned}$$

Rpta. B

Resolución 8



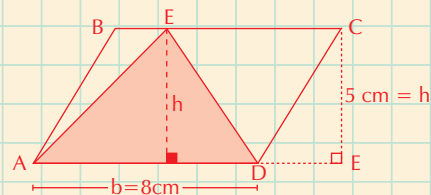
$$\begin{aligned}\text{Perímetro } \square &= 4L \\ 24 \text{ cm} &= 4L \Rightarrow L = 6 \text{ cm}\end{aligned}$$

Luego:

$$\begin{aligned}\text{Área } \triangle &= \frac{L \times L}{2} \\ &= \frac{6 \text{ cm} \times 6 \text{ cm}}{2} \\ &= 18 \text{ cm}^2\end{aligned}$$

Rpta. D

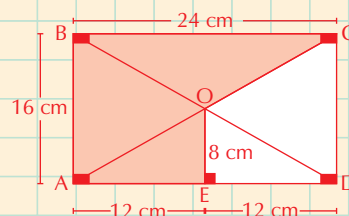
Resolución 9



$$\begin{aligned}\text{Área } \triangle &= \frac{b \times h}{2} \\ &= \frac{8 \text{ cm} \times 5 \text{ cm}}{2} \\ &= 20 \text{ cm}^2\end{aligned}$$

Rpta. E

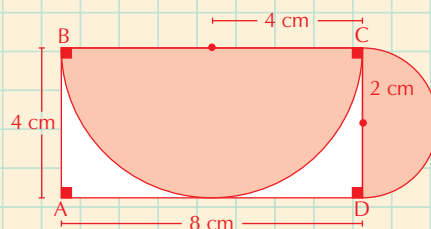
Resolución 10



$$\begin{aligned}\text{Área pintada} &= \text{Area } \triangle ABC + \text{Area } \triangle ADE \\ &= \frac{24 \text{ cm} \times 16 \text{ cm}}{2} + \frac{12 \text{ cm} \times 8 \text{ cm}}{2} \\ &= 240 \text{ cm}^2\end{aligned}$$

Rpta. D

Resolución 11



$$\begin{aligned}\text{Área pintada} &= \frac{\pi (4 \text{ cm})^2}{2} + \frac{\pi (2 \text{ m})^2}{2} \\ &= 10\pi \text{ cm}^2\end{aligned}$$

Rpta. E

Aplica tus aprendizajes 3

Resolución 1

$$\text{Volumen} = a^3 = (3 \text{ cm})^3 = 27 \text{ cm}^3 \quad \text{Rpta. C}$$

Resolución 2

$$\text{Área} = 4\pi r^2 = 4\pi(4 \text{ cm})^2 = 64 \pi \text{ cm}^2 \quad \text{Rpta. D}$$

Resolución 3

$$\text{Volumen} = 3a^3 = 3(2 \text{ cm})^3 = 24 \text{ cm}^3 \quad \text{Rpta. B}$$

Resolución 4

- A) La base de una pirámide siempre es un triángulo. (F)
- B) Un cubo tiene 24 aristas. (F)
- C) Un hexaedro regular está formado por 6 cuadrados. (V)
- D) Las caras laterales de un prisma triangular son triángulos. (F)
- E) Un cilindro se forma por rotación de un triángulo rectángulo sobre uno de sus catetos. (F)

∴ La afirmación correcta es la C. Rpta. C

Resolución 5

- I) Área de un cubo (III) $\frac{1}{3}\pi r^2 h$
- II) Volumen de un Prisma (IV) $\frac{4}{3}\pi \cdot r^3$
- III) Volumen de un Cono (I) $6a^2$
- IV) Volumen de una Esfera (II) $A_b \cdot h$

∴ III, IV, I, II Rpta. D

Resolución 6

- I) Un prisma tiene 6 caras (F)
- II) Un cono de revolución se genera por rotación de un rectángulo (F)
- III) Un cubo es un prisma (V)
- IV) Un cilindro se genera por rotación de un semicírculo al rededor de su diámetro (F)

∴ FFVF Rpta. C

Resolución 7

Rpta. El lado no es elemento de un sólido geométrico.

∴ Lado Rpta. C

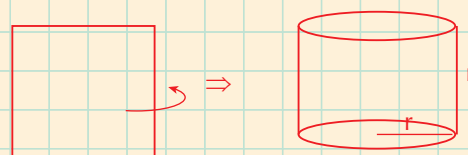
Resolución 8

- A) Sus bases son regiones poligonales. (V)
- B) La altura es la distancia entre las bases. (V)
- C) Las caras laterales son paralelogramos. (V)
- D) Sólo hay prismas regulares. (F)
- E) Su volumen es el producto del área de la base por su altura. (V)

Rpta. Es incorrecto afirmar que solo hay prismas regulares.

∴ VVVFV Rpta. D

Resolución 9



$$\text{Volumen} = \pi(r \text{ cm})^2 \cdot r \text{ cm}$$

$$343 \pi \text{ cm}^3 = r^3 \pi \text{ cm}^3 \Rightarrow r^3 = 343$$

$$r = 7$$

Calculamos el área lateral del cilindro

$$\text{Área lateral} = 2\pi r \cdot \text{altura}$$

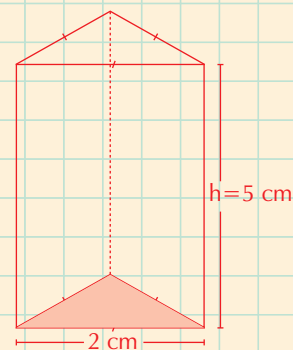
$$\text{Área lateral} = 2\pi(7) \cdot 7$$

$$\text{Área lateral} = 98 \pi \text{ cm}^2$$

Rpta. E

Aplica tus aprendizajes 4

Resolución 1



Calculamos el área de la base:

$$\text{Área de la base} = \frac{L \cdot \sqrt{3}}{4} = \frac{(2 \text{ cm})^2 \cdot \sqrt{3}}{4}$$

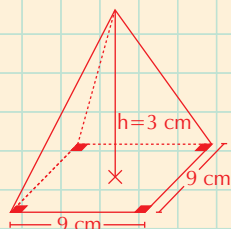
$$\boxed{\text{Área de la base} = \sqrt{3} \text{ cm}^2}$$

Calculamos el volumen del prisma

$$V = \text{área de la base} \times \text{altura}$$

$$V = \sqrt{3} \text{ cm}^2 \times 5 \text{ cm} \Rightarrow V = 5\sqrt{3} \text{ cm}^3 \quad \text{Rpta. B}$$

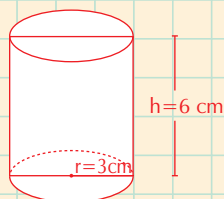
Resolución 2



$$\begin{aligned}\text{Volumen} &= \frac{1}{3} (\text{área de la base}) \times \text{altura} \\ &= \frac{1}{3} (9 \text{ cm})^2 \times 3 \text{ cm} \\ &= 81 \text{ cm}^3\end{aligned}$$

Rpta. A

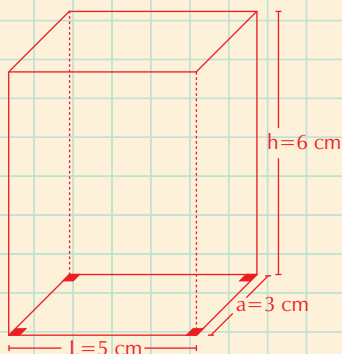
Resolución 3



$$\begin{aligned}\text{Área lateral} &= 2\pi \cdot r \cdot h \\ &= 2\pi \cdot 3 \text{ cm} \cdot 6 \text{ cm} \\ &= 36\pi \text{ cm}^2\end{aligned}$$

Rpta. D

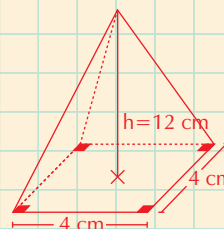
Resolución 4



$$\begin{aligned}\text{Volumen del prisma} &= \text{área de la base} \times \text{altura} \\ &= (5 \text{ cm} \times 3 \text{ cm}) \times 6 \text{ cm} \\ &= 90 \text{ cm}^3\end{aligned}$$

Rpta. C

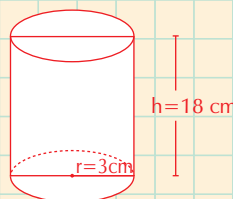
Resolución 5



$$\begin{aligned}\text{Volumen} &= \frac{1}{3} (\text{área de la base}) \times \text{altura} \\ &= \frac{1}{3} (4 \text{ cm})^2 \times 12 \text{ cm} \\ &= 64 \text{ cm}^3\end{aligned}$$

Rpta. A

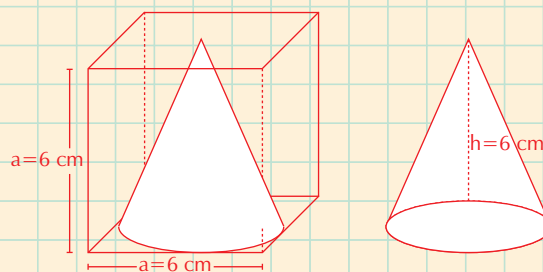
Resolución 6



$$\begin{aligned}\text{Volumen} &= \pi r^2 \cdot h \\ &= \pi \cdot (3 \text{ cm})^2 \cdot 18 \text{ cm} \\ &= 162\pi \text{ cm}^3\end{aligned}$$

Rpta. C

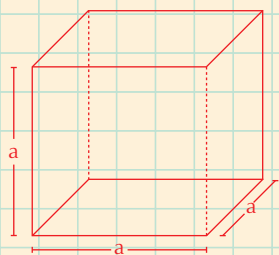
Resolución 7



$$\begin{aligned}\text{Volumen del cono} &= \frac{1}{3} \pi r^2 \cdot h \\ &= \frac{1}{3} \pi \cdot (3 \text{ cm})^2 \cdot 6 \text{ cm} \\ &= 18\pi \text{ cm}^3\end{aligned}$$

Rpta. B

Resolución 8



$$\begin{aligned}\text{Volumen} &= 3 \times \text{área} \\ a^3 &= 3 \times (6a^2) \\ a &= 18\end{aligned}$$

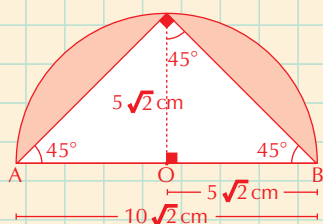
Número de aristas del cubo = 12

Luego:

$$\begin{aligned}\text{Suma de las aristas del cubo} &= 12a \\ &= 12 \times 18 \\ &= 216\end{aligned}$$

Rpta. C

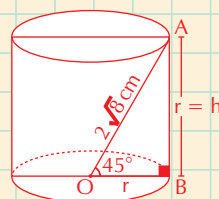
Resolución 9



$$\begin{aligned}\text{Área coloreada} &= \text{área}_{\text{sector}} - \text{área}_{\text{triángulo}} \\ &= \frac{\pi \cdot (5\sqrt{2}\text{ cm})^2}{2} - \frac{10\sqrt{2}\text{ cm} \cdot 5\sqrt{2}\text{ cm}}{2} \\ &= 25\pi\text{ cm}^2 - 50\text{ cm}^2 \\ &= 25(\pi - 2)\text{ cm}^2\end{aligned}$$

Rpta. C

Resolución 10



En el $\triangle OBA$: Por el Teorema de Pitágoras

$$r^2 + r^2 = (2\sqrt{8})^2$$

$$r = 4$$

Luego:

$$\begin{aligned}\text{Volumen del cilindro} &= \pi r^2 \cdot h \\ &= \pi(4\text{ cm})^2 \times 4\text{ cm} \\ &= 64\pi\text{ cm}^3\end{aligned}$$

Rpta. A

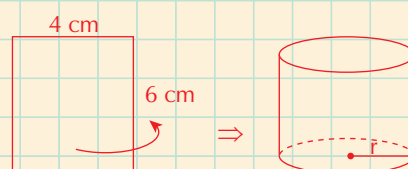
Resolución 11

Sean: a = largo
 b = ancho

Del enunciado tenemos

$$\begin{aligned}& * \quad \begin{cases} 2(a + b) = 20 \\ a + b = 10 \end{cases} \\ & * \quad \begin{cases} a - b = 2 \end{cases} \\ & \hline 2a = 12 \Rightarrow a = 6, b = 4\end{aligned}$$

Volumen = Área de la base $\times$ altura



$$\begin{aligned}\text{Volumen} &= \pi(4\text{ cm})^2 \times 6\text{ cm} \\ &= 96\pi\text{ cm}^3\end{aligned}$$

Rpta. D

UNIDAD 8

Solucionario Aplica tus aprendizajes



Aplica tus aprendizajes 1

Resolución 4f

Para ser regular el número tiene que estar entre el 80% y 90 % así $[80\% - 90\% >$

$$80\%(40) = \frac{80}{100}(40) = 32$$

$$90\%(40) = \frac{90}{100}(40) = 36$$

Es decir el número de focos que encienden debería estar en el intervalo $[32 \text{ y } 36 >$

Como 28 encienden Faltarían $[4, 8 >$

Resolución 4g

$[90\% - 100\% >$

$\Rightarrow$ El número de focos que encienden debería estar en $[36, 40 >$

$\Rightarrow$ Como hay 28, faltarían $[36 - 28, 40 - 28 > \therefore [8 ; 12 >$

Resolución 5

f_1 : frecuencia de billetes de 10

f_2 : " " " de 20

f_3 : " " " de 50

f_4 : " " " de 100

Por dato : $f_1 = 50$

$$\text{También: } \frac{f_3}{400} = 0,2 \Rightarrow f_3 = 80$$

$$\text{Además } f_4 = f_2 + 30$$

$$f_1 + f_2 + f_3 + f_4 = 400$$

$$50 + f_2 + 80 + f_2 + 30 = 400$$

$$2f_2 + 160 = 400 \Rightarrow f_2 = 120$$

$$\Rightarrow f_4 = 150$$

Resolución 6

$$h_3 = 0,2$$

$$h_1 = \frac{f_1}{400} = \frac{50}{400} = 0,125$$

Del ejercicio anterior:

$$h_2 = \frac{f_2}{400} = \frac{120}{400} = 0,3$$

$$h_4 = \frac{f_4}{400} = \frac{150}{400} = 0,375$$

$$\text{Luego } h_1 + h_4 = 0,125 + 0,375 = 0,50$$

$$h_2 + h_3 = 0,3 + 0,2 = 0,50$$

$$\Rightarrow h_2 + h_3 = h_1 + h_4 = 0,50$$

Resolución 7

x_i	f_i	F_i
3	1	1
4	1	2
5	3	5
6	1	6
7	1	7
8	2	9
10	3	12
11	1	13
12	2	15

Rpta. E

Resolución 8

x_i	1	3	5	7	9	11	13
f_i	2	1	1	1	2	1	1

$$N = 9 \text{ (impar)}$$

$$\frac{N+1}{2} = \frac{9+1}{2} = 5$$

$$\Rightarrow \text{Me} = x_5 = 7$$

Rpta. B

Resolución 9

$$N = 15 \text{ (impar)}$$

$$\Rightarrow \frac{N+1}{2} = \frac{15+1}{2} = 8$$

$$\Rightarrow \text{Me} = x_8 = 8$$

$$\text{Mo} = 5 \text{ y } 10$$

bimodal

Rpta. A

Resolución 10

$$0, 1, 2, 3, 4, 5, 6, 7, 8, 9, \dots, 17$$

$$N = 18 \text{ (par)}$$

$$\frac{N}{2} = 9 ; \frac{N}{2} + 1 = 10$$

$$\text{Me} = \frac{x_9 + x_{10}}{2} = \frac{8 + 9}{2} = 8,5$$

Rpta. B

Resolución 11

$$\bar{x} = \frac{2+3+5+7+11+13+17+19+23+29}{10}$$

$$\bar{x} = 12,9$$

Rpta. C

Resolución 12

$$\text{Mo} = 14 \text{ y } 21$$

bimodal

Rpta. C

Aplica tus aprendizajes 2

Resolución 5

$$N = 60 \text{ (par)}$$

$$\Rightarrow \frac{N}{2} = 30 ; \frac{N}{2} + 1 = 31$$

$$Me = \frac{x_{30} + x_{31}}{2} = \frac{16 + 17}{2} = 16,5 \quad \text{Rpta. C}$$

Resolución 6

$$\bar{x} = \frac{85(2) + 90(3) + 95(5) + 100(7) + 105(2) + 110(4) + 115(4) + 120(2) + 125}{30}$$

$$\bar{x} = 103 \quad \text{Rpta. D}$$

Resolución 7

$$\frac{135}{360} = \frac{x}{32} \Rightarrow x = 12 \quad \text{Rpta. B}$$

Resolución 8

$$= \frac{10 + 15 + 25 + 20 + 30 + 35 + 25}{7}$$

$$= 22,857 \approx 22,86 \quad \text{Rpta. B}$$

Resolución 9

$$\left(\frac{500 - 400}{400} \right) \times 100\% = 25\% \quad \text{Rpta. C}$$

Resolución 10

$$10 + 15 + 20 + 25 + 30 + 35 = 135 \quad \text{Rpta. C}$$

$$\text{Resolución 11} \quad 35 \quad \text{Rpta. D}$$

$$\text{Resolución 12} \quad 135 \quad \text{Rpta. A}$$

Aplica tus aprendizajes 3

Resolución 1

10	30	20	50	20	100	80
20	10	60	90	50	20	60
80	30	40	90	40	20	80
20	50	30	60	50	40	30
40	60	80	40	60	50	40
60	20	50	20	50		

$$\frac{5}{40} \times 100\% = 12,5\% \quad \text{Rpta. E}$$

Resolución 2

x_i	1	2	5	6	7	8	9
f_i	1	2	1	1	3	1	1

$$\bar{x} = \frac{1 + 2(2) + 5 + 6 + 7(3) + 8 + 9}{10}$$

$$= \frac{54}{10} = 5,4$$

$$N = 10 \quad \text{(par)}$$

$$\Rightarrow \frac{N}{2} = 5 ; \frac{N}{2} + 1 = 6$$

$$Me = \frac{x_5 + x_6}{2} = \frac{6 + 7}{2} = 6,5$$

$$Mo = 7 \quad \text{(mayor frecuencia)} \quad \text{Rpta. C}$$

Resolución 3

$$\frac{80 - 60}{60} = \frac{20}{60} = \frac{1}{3} \quad \text{Rpta. B}$$

Resolución 4

$$\frac{(60 + 80 + 100) - (80 + 80 + 60)}{240} = \frac{20}{220}$$

% de disminución

$$\frac{20}{240} \times 100\% = 8,3\% \quad \text{Rpta. A}$$

Resolución 5

14	17	19	17	13	16
18	18	21	14	17	18
17	20	19	19	14	16
13	17	13	16	19	21
18	13	15	13	17	20
20	16	17	20	21	18
19	13	18	21	14	13
16	14	17	17	13	15
15	19	19	19	17	16
19	13	20	18	13	20

x_i	13	14	15	16	17	18	19	20	21
f_i	9	5	6	6	10	5	9	6	4

Elemento de menor frecuencia: 21

Moda: $M_o = 17$

$$21 - 17 = 4$$

Rpta. E

Resolución 6

$$a) \frac{12(4) + 10(4) + 15(5) + 12(4)}{17} = 12,4 = 12$$

b) 4

Rpta. D

Aplica tus aprendizajes 4

Resolución 1

$$\frac{64 \cdot 63! \cdot 32!}{33 \cdot 32! \cdot 63!} = \frac{64}{33}$$

Rpta. A

Resolución 2

$$\begin{aligned} &= \frac{28! \cdot 25! \cdot 30 \cdot 29!}{29! \cdot 27! \cdot 26!} \\ &= \frac{28 \cdot 27! \cdot 25! \cdot 30}{27! \cdot 26 \cdot 25!} \\ &= \frac{28 \cdot 30}{26} = \frac{420}{13} \end{aligned}$$

Rpta. D

Resolución 3

$$\begin{aligned} x(x-1)(x-2)! &= 56(x-2)! \\ (x-2)! [x(x-1) - 56] &= 0 \\ (x-2)! (x^2 - x - 56) &= 0 \\ \begin{array}{r} x & -8 \\ x & 7 \\ \hline \end{array} \\ (x-8)(x+7) &= 0 \\ x = 8 \vee x = -7 \\ x &= 8 \end{aligned}$$

Rpta. B

Resolución 4

$$5x! - 2x! = 72$$

$$3x! = 72 \Rightarrow x! = 24$$

$$\Rightarrow x = 4$$

Rpta. E

Resolución 5

$$3(x! + 30) = 5(x! - 30)$$

$$3x! + 90 = 5x! - 150$$

$$240 = 2x! \Rightarrow x! = 120$$

$$\Rightarrow x = 5$$

Rpta. C

Resolución 6

$$16x! = 96 \Rightarrow x! = 6$$

$$(x!)! = 6! = 720$$

Rpta. A

Resolución 7

$$x!^{x!} = 4 \quad 2^2 = x!^{x!}$$

$$x! = 2 \quad x!^{x!} = 2^{2^2} = 2^4 = 16$$

Rpta. E

Resolución 8

$$(x+1)! = 7!$$

$$\Rightarrow x+1 = 7 \Rightarrow x = 6$$

$$(x-1)! = (6-1)! = 5! = 120$$

Rpta. A

Resolución 9

$$(4x-3)! = 120$$

$$(4x-3)! = 5!$$

$$4x = 8 \rightarrow x = 2$$

$$\left(\frac{1}{2}x + 4\right)! = \left(\frac{1}{2}(2) + 4\right)! = 5! = 120$$

Rpta. A

Resolución 10

$$C_8^n = C_3^n \Rightarrow n = 8 + 3 = 11$$

$$C_{21}^{2n} = C_{21}^{22} = \frac{22!}{21!(22-21)!} = 22$$

Rpta. B

Resolución 11

$$\begin{aligned} \frac{2}{3} C_{2998}^{3000} &= \frac{2}{3} \cdot \frac{3000!}{2998! \cdot 2!} \\ &= \frac{3000 \cdot 2999 \cdot 2998!}{3(2998!)} = 2\,999\,000 \end{aligned}$$

Rpta. B

Resolución 12

$$V_2^m = 30 \Rightarrow \frac{m!}{(m-2)!} = 30$$

$$\frac{m \cdot (m-1) \cdot \cancel{(m-2)!}}{\cancel{(m-2)!}} = 30$$

$$m^2 - m - 30 = 0$$

$$m \quad -6$$

$$m \quad 5$$

$$(m-6)(m+5) = 0$$

$$m = 6 \quad \vee \quad m = -5$$

$$C_7^n = 8 \Rightarrow \frac{n!}{7!(n-7)!} = 8$$

$$\Rightarrow n = 8 \text{ (simple inspección)}$$

$$\Rightarrow m + n = 6 + 8 = 14$$

Rpta. A

Resolución 13

$$(x-3)(x-4)! = 17(x-4)!$$

$$(x-4)!(x-3-17) = 0$$

$$(x-4)!(x-20) = 0$$

$$(x-4)! \neq 0 \Rightarrow x = 20$$

Rpta. D

Resolución 14

$$\frac{3 \times 6 \times 8 \times n!}{24} = 6!$$

$$6n! = 720 \rightarrow n! = 120$$

$$n = 5$$

Rpta. C

Resolución 15

$$V_2^n = 6 \Rightarrow \frac{n!}{(n-2)!} = 6$$

$$\frac{n \cdot (n-1)(\cancel{n-2})!}{(\cancel{n-2})!} = 6$$

$$n^2 - n - 6 = 0$$

$$(n-3)(n+2) = 0 \Rightarrow n = 3$$

$$C_{n+1}^{2n} = C_4^6 = \frac{6!}{4! \cdot 2!} = \frac{6 \times 5 \times \cancel{4}!}{\cancel{4}! \times 2} = 15$$

Rpta. A

Resolución 16

$$\frac{x!}{4!(x-4)!} = x-3$$

$$\frac{x(x-1)(x-2)(x-3)(\cancel{x-4})!}{4!(\cancel{x-4})!} = x-3$$

$$\text{Como } x \neq 3$$

$$\Rightarrow x(x-1)(x-2) = 4 \times 3 \times 2 = 4!$$

$$\Rightarrow x = 4$$

Rpta. E

Resolución 17

$$C_3^x + C_4^x = x+1$$

$$\frac{x!}{(x-3)!3!} + \frac{x!}{(x-4)!4!} = (x+1)$$

$$\frac{x!}{(x-4)!(x-3)3!} + \frac{x!}{(x-4)!3!4} = (x+1)$$

$$\frac{x!}{(x-4)!3!} \left[\frac{x+1}{(x-3)4} \right] = (x+1)$$

$$\frac{\cancel{(x-4)!}(x-3)(x-2)(x-1)x}{(\cancel{x-4})!(x-3)} = 4 \cdot 3!$$

$$\frac{(x-2)(x-1)x}{x} = \frac{2 \cdot 3 \cdot 4}{x}$$

$$x = 4$$

Rpta. D

Resolución 18

$$\frac{x!}{(x-3)!} = \frac{x!}{(x-4)!}$$

$$(x-3)! = (x-4)!$$

$$(x-3)(x-4)! - (x-4)! = 0$$

$$(x-4)!(x-4) = 0 \Rightarrow x = 4$$

Rpta. C

Resolución 19

$$\frac{x!}{(\cancel{x-4})!} = \frac{4(x-1)!}{(\cancel{x-1-3})!}$$

$$x(x-1)! = 4(x-1)!$$

$$\Rightarrow x = 4$$

$$C_{x-1}^{x+1} = C_3^5 = \frac{5!}{3! \cdot 2!} = \frac{5 \times 4 \times 3!}{3! \cdot 2} = 10$$

Rpta. A

Resolución 20

$$V_k^n = 6 \cdot 5 \cdot 4$$

$$V_k^n = V_3^6$$

$$\text{Donde: } n = 6 ; k = 3$$

Luego:

$$V_{k-1}^{2n} = V_2^{12}$$

$$= \frac{12!}{10!}$$

$$= \frac{10! \times 11 \times 12}{10!} = 132$$

Rpta. D

Resolución 21

$$\frac{x!}{(\cancel{x-4})!} \cdot \frac{(\cancel{x-4})!}{(x-4-3)!} = \frac{x!}{(x-7)!}$$

$$= V_7^x$$

Resolución 22

$$\frac{n!}{2! \cdot 6!} = 28 \Rightarrow n! = 2 \times 6! \times 7 \times 4$$

$$n! = 8 \times 7! \Rightarrow n! = 8!$$

$$\Rightarrow n = 8$$

Rpta. E

Aplica tus aprendizajes 5

Resolución 2

$$n = 10 ; k = 6$$

$$\begin{aligned} t_{6+1} &= C_6^{10} (2x^3)^{10-6} \left(-\frac{1}{4}y^4\right)^6 \\ &= C_6^{10} 2^4 \cdot x^{12} \cdot \frac{y^{24}}{2^{12}} = C_6^{10} \frac{x^{12} y^{24}}{256} \end{aligned}$$

Rpta. A

Resolución 3

El término de lugar k en $\frac{a^n - b^n}{a + b}$

$$\text{es } t_k = (\text{signo}) a^{n-k} b^{k-1}$$

En el ejercicio:

$$\begin{aligned} &\frac{(a^3)^{50} - (b^2)^{50}}{a^3 + b^2} \\ t_{40} &= -(a^3)^{50-40} (b^2)^{40-1} \\ &= -a^{30} b^{78} \end{aligned}$$

* Los signos son alternadamente positivos y negativos.
Positivos los de lugar impar y negativos los de lugar par.

Rpta. A

Resolución 4

$$n = 8 ; k = 5$$

$$\begin{aligned} t_{5+1} &= C_5^8 (2x^2)^{8-5} (y^3)^5 \\ &= C_5^8 2^3 \cdot x^6 \cdot y^{15} = C_5^8 8x^6 y^{15} \end{aligned}$$

Rpta. B

Resolución 5

$$n = 6 ; k = 3$$

$$\begin{aligned} t_4 = t_{3+1} &= C_3^6 (2a)^{6-3} b^3 \\ &= C_3^6 8a^3 b^3 \end{aligned}$$

Rpta. A

Resolución 6

El quinto término es el último
En este caso es b^4

Rpta. B

Resolución 7

$$n = 3 ; k = 2$$

$$\begin{aligned} t_{2+1} &= C_2^3 (2x)^{3-2} (-3y)^2 \\ &= C_2^3 2x \cdot (9y^2) = C_2^3 18xy^2 \end{aligned}$$

Rpta. D

Resolución 8

$$n = 7 ; k = 4$$

$$\begin{aligned} t_{4+1} &= C_4^7 (x^2)^{7-4} (2y^3)^4 \\ &= C_4^7 16x^6 y^{12} \end{aligned}$$

Rpta. C

Resolución 9

$$n = 8 ; k = 5$$

$$\begin{aligned} t_6 = t_{5+1} &= C_5^8 x^{8-5} y^5 \\ &= C_5^8 x^3 y^5 \end{aligned}$$

Rpta. A

Resolución 10

$$n = 7 ; k = 5$$

$$\begin{aligned} t_6 = t_{5+1} &= C_5^7 (2x^5)^{7-5} (-x^3)^5 \\ &= C_5^7 2^2 x^{10} (-x^{15}) \\ &= C_5^7 (-4) x^{25} \end{aligned}$$

Rpta. C

Resolución 11

$$\frac{(a^{m-4})^4 - (b^{m-5})^4}{a^{m-4} + b^{m-5}}$$

$$n = 4 ; k = 4$$

$$t_k = (\text{Signo}) (a^{m-4})^{m-k} \cdot (b^{m-5})^{k-1}$$

$$t_4 = -(a^{m-4})^{4-4} \cdot (b^{m-5})^{4-1}$$

$$t_4 = -b^{3(m-5)} = -b^{3m-15}$$

Rpta. D

PARTE II

Resolución 1

$$\begin{aligned}(a^2 + b)^4 &= (a^2)^4 + 4(a^2)^3 b + 6(a^2)^2 b^2 + 4(a^2) b^3 + b^4 \\ &= a^8 + 4a^6 b + 6a^4 b^2 + 4a^2 b^3 + b^4 \\ a) \text{ V} \quad b) \text{ V} \quad c) \text{ V}\end{aligned}$$

Rpta. A

Resolución 2

$$\begin{aligned}T_{3+1} &= C_3^6 (2a)^{6-3} \cdot (b)^3 \\ &= \frac{6 \cdot 5 \cdot 4}{3 \cdot 2 \cdot 1} (2a)^3 b^3 \\ &= 20(8a^3)b^3 \\ \therefore T_4 &= 160a^3 b^3\end{aligned}$$

Rpta. A

Resolución 3

$$\begin{aligned}n &= 6 ; k = 4 \\ t_5 = t_{4+1} &= C_4^6 (a^2)^{6-4} (b^2)^4 \\ &= \frac{6!}{4! \cdot 2!} a^4 b^8 = 15a^4 b^8\end{aligned}$$

Rpta. A

Resolución 4

$$\begin{aligned}n &= 8 ; k = 3 \\ t_4 = t_{3+1} &= C_3^8 x^{8-3} a^3 = C_3^8 x^5 a^3\end{aligned}$$

Rpta. C

Resolución 5

$$\begin{aligned}n &= 10 ; k = 2 \\ t_3 = t_{2+1} &= C_2^{10} (4y)^{10-2} \cdot 5^2 \\ &= C_2^{10} (4y)^8 \cdot 5^2\end{aligned}$$

Rpta. A

Resolución 6

$$\begin{aligned}n &= 7 ; k = 3 \\ t_4 = t_{3+1} &= C_3^7 y^{7-3} \cdot 9^3 \\ &= C_3^7 y^4 \cdot 9^3\end{aligned}$$

Rpta. C

Resolución 7

$$\begin{aligned}(2x - 3y)^3 &= (2x)^3 - 3(2x)^2(3y) + 3(2x)(3y)^2 - (3y)^3 \\ &= 8x^3 - 36x^2y + 54xy^2 - 27y^3 \\ a) \text{ V} \quad b) \text{ F} \quad c) \text{ V}\end{aligned}$$

Rpta. A

Resolución 8

$$\begin{aligned}n &= 12 ; k = 3 \\ t_4 = t_{3+1} &= C_3^{12} (7x)^{12-3} (-5y)^3 \\ &= C_3^{12} (7x)^9 (-5y)^3\end{aligned}$$

Rpta. A

Resolución 9

$$\begin{aligned}n &= 7 ; k = 4 \\ t_{4+1} &= C_4^7 (x^2)^{7-4} (2y^3)^4 \\ &= \frac{7!}{4! \cdot 3!} x^6 16 y^{12} \\ &= \frac{7 \times 6 \times 5 \times 4!}{4! \cdot 3!} 16x^6 y^{12} = 560x^6 y^{12}\end{aligned}$$

Rpta. B

Resolución 10

$$\begin{aligned}n &= 8 ; k = 5 \\ t_6 = t_{5+1} &= C_5^8 a^{8-5} b^5 \\ &= \frac{8 \times 7 \times 6 \times 5!}{5! \cdot 3!} \cdot a^3 b^5 = 56a^3 b^5\end{aligned}$$

Rpta. C

Resolución 11

$$\begin{aligned}(x + a)^6 &= x^6 + 6x^5a + 15x^4a^2 + 20x^3a^3 + 15x^2a^4 + 6xa^5 + a^6 \\ a) \text{ V} \quad b) \text{ F} \quad c) \text{ V}\end{aligned}$$

Rpta. D

Resolución 12

$$\begin{aligned}(2x + y)^4 &= (2x)^4 + 4(2x)^3y + 6(2x)^2y^2 + 4(2x)y^3 + y^4 \\ &= 16x^4 + 32x^3y + 24x^2y^2 + 8xy^3 + y^4\end{aligned}$$

Rpta. D

Aplica tus aprendizajes 6

Resolución 1

$$\begin{array}{ccccc} a & b & c & d & e \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ \# \text{ valores: } & 3 & 3 & 3 & 3 \end{array}$$

Total de números de

$$5 \text{ cifras} = 3 \times 3 \times 3 \times 3 \times 3 = 243$$

Rpta. D

Resolución 2

$$P_5 = 5! = 120$$

Rpta. D

Resolución 3

$$\begin{array}{ccc} a & b & 8 & c \\ \downarrow & \downarrow & & \downarrow \\ \# \text{ valores: } & 3 & 3 & 3 \end{array}$$

$$\text{Total de números de} = 3 \times 3 \times 3 = 27$$

Rpta. c

Resolución 4

Combinaciones

$$C_5^9 = \frac{9 \times 8 \times 7 \times 6 \times 5!}{5! \times 4 \times 3 \times 2 \times 1}$$

$$C_5^9 = 126$$

Rpta. C

Resolución 5

Combinaciones

$$C_6^8 = \frac{8 \times 7 \times 6 \times 5 \times 4 \times 3}{6 \times 5 \times 4 \times 3 \times 2 \times 1}$$

$$C_6^8 = 28$$

Rpta. D

Resolución 6

$$P_{7-2} = P_5 = 5! = 120$$

Rpta. D

Resolución 7

$$V_4^x = x(x-1)(x-2)(x-3)$$

$$V_6^x = x(x-1)(x-2)(x-3)(x-4)(x-5)$$

$$\Rightarrow \frac{x(x-1)(x-2)(x-3)}{x(x-1)(x-2)(x-3)(x-4)(x-5)} = \frac{1}{12}$$

$$\frac{1}{(x-4)(x-5)} = \frac{1}{12}$$

$$\Rightarrow (x-4)(x-5) = 12$$

$$(x-4)(x-5) = (4) \cdot (3)$$

$$x-4 = 4 \rightarrow x = 8$$

$$x-5 = 3 \rightarrow x = 8$$

$$x = 8$$

Rpta. C

Resolución 8

Números de 3 cifras

$$\begin{array}{ccc} a & b & c \\ \downarrow & \downarrow & \downarrow \\ \# \text{ valores que puede tomar: } & 5 & 5 & 5 \end{array}$$

$$\# \text{ valores que puede tomar: } 5 \times 5 \times 5 = 125$$

$$\text{Total de números de} = 5 \times 5 \times 5 = 125$$

Rpta. B

Resolución 9

$$V_6^x = V_5^x$$

$$\frac{x!}{(x-6)!} = \frac{x!}{(x-5)!}$$

$$(x-6)! = (x-5)!$$

$$(x-6)! = (x-5)(x-6)!$$

$$1 = x-5$$

$$x = 6$$

El número de elementos es 6.

Rpta. E

Resolución 10

$$V_4^5 = \frac{5!}{(5-4)!} = \frac{120}{1!}$$

$$V_4^5 = 120$$

Rpta. b

Resolución 11

CAMBIAR

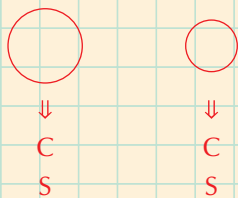
7 letras $\Rightarrow$ A: 2 veces

$$P_2^7 = \frac{7!}{2!} = \frac{5\,040}{2}$$

$$P_2^7 = 2\,520$$

$\therefore 2\,520$ Rpta. D

Resolución 12



Podrán caer:

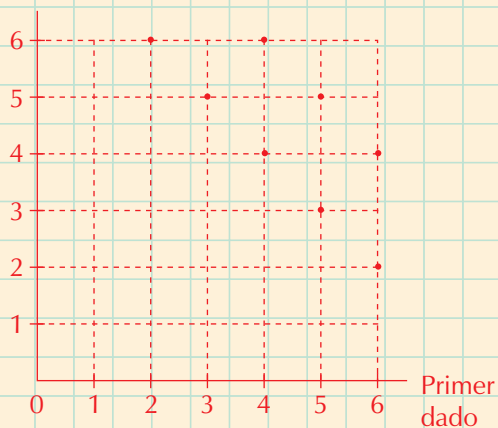
$\{(C, C), (C, S), (S, C), (S, S)\}$

De 4 maneras.

Rpta. B

Resolución 13

Segundo dado

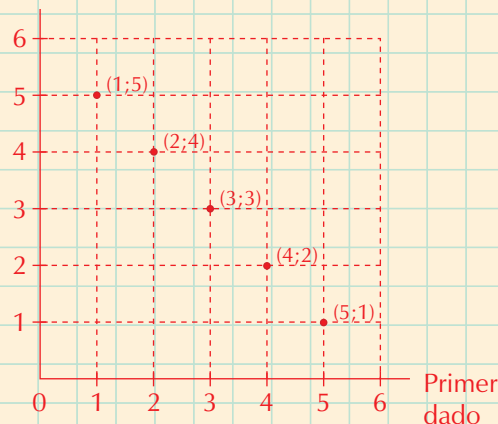


$$P = \frac{8}{36} = \frac{2}{9}$$

Rpta. B

Resolución 14

Segundo dado



$$P = \frac{1}{5} = 0,2$$

Aplica tus aprendizajes 7

Resolución 1

$$P = \frac{1}{2}$$

Resolución 2

$$n(E) = 6$$

Casos favorables: 1

$$P = \frac{1}{6}$$

Rpta. D

Resolución 3

$$n(E) = 6$$

número par $\{2, 4, 6\} \Rightarrow n(A) = 3$

$$P = \frac{3}{6} = \frac{1}{2}$$

Rpta. D

Resolución 4

$$n(E) = 6$$

mayor que 4 $\Rightarrow \{5, 6\} \Rightarrow n(A) = 2$

$$P = \frac{2}{6} = \frac{1}{3}$$

Rpta. A

Resolución 5

Total de casos: $6 \times 6 = 36$

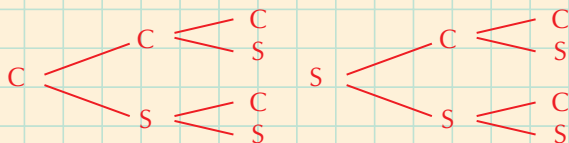
Casos favorables (que suman 7)

$\{(1;6), (2;5), (3;4), (4;3), (5;2), (6;1)\}$

6 casos

$$\Rightarrow P = \frac{6}{36} = \frac{1}{6}$$

Rpta. D

Resolución 6

$$E = \{(C;C;C), (\overline{C;C;S}), (\overline{C;S;C}), (C;S;S), (\overline{S;C;C}), (S;C;S), (\overline{S;S;C}), (\overline{S;S;S})\}$$

$$n(E) = 8$$

2 caras y un sello

Casos favorables: 3

$$P = \frac{3}{8}$$

Rpta. A

Resolución 7

Por lo menos una cara: 7

$$P = \frac{7}{8}$$

Rpta. C

Resolución 8

Total: $6 \times 6 = 36$

de casos favorables (sumen 6)

$\{(1;5), (2;4), (3;3), (4;2), (5;1)\}$ 5 casos

$$P = \frac{5}{36}$$

Rpta. B

Resolución 9

Total: $6 \times 6 = 36$

de casos favorables (obtener el mismo número)

$\{(1;1), (2;2), (3;3), (4;4), (5;5), (6;6)\}$ 6 casos

$$P = \frac{6}{36} = \frac{1}{6}$$

Rpta. B

Resolución 10

En un mazo hay solo un haz de trébol

$$P = \frac{1}{52}$$

Rpta. D

Resolución 11

En un mazo hay 13 espadas

$$\Rightarrow P = \frac{13}{52} = \frac{1}{4}$$

Rpta. B

Resolución 12

Hay 4 setes (uno en cada palo)

$$\Rightarrow P = \frac{4}{52} = \frac{1}{13}$$

Rpta. B

Resolución 13

En una maza hay 26 cartas negras

$$\Rightarrow P = \frac{26}{52} = \frac{1}{2}$$

Rpta. C

Resolución 14

números de cartas que no son A

$$52 - 4 = 48$$

$$\Rightarrow P = \frac{48}{52} = \frac{12}{13}$$

Rpta. D

Resolución 15

Total de casos

$$2 \times 6 = 12$$

Hay solo una posibilidad de tener 5 y cara

$$\Rightarrow P = \frac{1}{12}$$

Rpta. D

Resolución 16

$$\text{I. } P = \frac{26}{52} = \frac{1}{2} \quad (\text{V})$$

II. Por C/ palo hay 4 cartas mayores ó iguales a 10

$\Rightarrow$ En los 4 palos del mazo: $4 \times 4 = 16$

$$\Rightarrow P = \frac{16}{52} = \frac{4}{13}$$

III. números primos: 2, 3, 5, 7, 11, 13

$\Rightarrow$ En c/ palo son 6

$\Rightarrow$ En toda la baraja: $6 \times 4 = 24$

$$\Rightarrow P = \frac{24}{52} = \frac{6}{13} \quad (\text{F})$$

IV. Hay en un mazo, 2 palos rojos y en cada uno. Hay 6 números pares que son 2, 4, 6, 8, 10, 12

$\Rightarrow$ Posibilidades favorables $6 \times 2 = 12 \quad (\text{F})$

$$\Rightarrow P = \frac{12}{52} = \frac{3}{13}$$

Rpta. D

Aplica tus aprendizajes 8

Resolución 1

Enfriar agua a 0°C no es aleatorio porque se sabe el resultado.

Rpta. B

Resolución 2

Fecha de nacimiento de un amigo no es aleatorio
El resultado es único.

Rpta. E

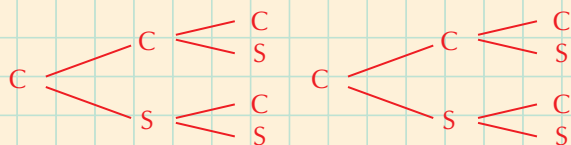
Resolución 3

$$E = \{1, 2, 3, \dots, 16\}$$

$$\Rightarrow n(E) = 16$$

Rpta. C

Resolución 4



$$E = \{(C;C;C), (C;C;S), (C;S;C), \dots, (S;S;S)\}$$

$$\Rightarrow n(E) = 8$$

$$\text{otra forma: } 2^3 = 8$$

Rpta. C

Resolución 5

$$\begin{array}{ccc} \text{dado 1} & & \text{dado 2} \\ 6 & \times & 6 = 36 \end{array}$$

Rpta. C

Resolución 6

$$A = \{(2;6), (3;5), (4;4), (5;3), (6;2)\}$$

$$n(A) = 5$$

Rpta. B

Resolución 7

Rpta: C

Si todas son negras.

Resolución 8

Rpta. B

Resolución 9

Rpta. E

Resolución 10

Rpta. C

Resolución 11

$$\begin{array}{ccccccccc} a & & b & & c & & d & & e \\ 2 & \times & 2 & \times & 2 & \times & 2 & \times & 2 = 32 \end{array}$$

Rpta. E

Resolución 12

$$\begin{array}{cccc} a & & b & & c \\ 6 & \cdot & 6 & \cdot & 6 = 216 \end{array}$$

Rpta. A

Resolución 13

$$\begin{array}{cccc} \text{dado} & & a & b & c \\ 6 & \times & 2 & \times & 2 \times 2 = 48 \end{array}$$

Rpta. B

Aplica tus aprendizajes 9

Resolución 1

$$n(E) = 5 + 4 = 9$$

Como hay 4 rojas

$$\Rightarrow P_{(R)} = \frac{4}{9}$$

Rpta. E

Resolución 2

$$n(E) = 6 + 3 + 4 = 13$$

Como hay 6 blancas

$$\Rightarrow P_{(R)} = \frac{6}{13}$$

Rpta. A

Resolución 3

$$n(E) = 500$$

Casos favorables: 20

$$\Rightarrow P = \frac{20}{500} = \frac{1}{25}$$

Rpta. C

Resolución 4

$$n(E) = 8 + 12 + 4 = 24$$

verde ó azul: $8 + 4 = 12$

$$\Rightarrow P = \frac{12}{24} = \frac{1}{2}$$

Rpta. D

Resolución 5

1

Suceso seguro

Rpta. D

Resolución 6

$$n(E) = 8 + 5 = 13$$

negras: 8

$$\Rightarrow P = \frac{8}{13}$$

Rpta. D

Resolución 7

$$n(E) = 20$$

número mayor que 5

$\{6, 7, 8, \dots, 20\}$

15 números

$$\Rightarrow P = \frac{15}{20} = \frac{3}{4}$$

Rpta. B

Resolución 8

$$n(E) = 6 \times 2 = 12$$

Dado, número par: $\{2, 4, 6\}$

moneda: sello

Casos favorables: $3 \times 1 = 3$

$$\Rightarrow P = \frac{3}{12} = \frac{1}{4}$$

Rpta. A

Resolución 9

$$n(E) = 4$$

Casos favorables: 1

$$\Rightarrow P = \frac{1}{4}$$

Rpta. B

Resolución 10

$$n(E) = 8$$

Casos favorables: 1

$$\Rightarrow P = \frac{1}{8}$$

Rpta. C

Resolución 11

$$n(E) = 6$$

mayor que 2: $\{3, 4, 5, 6\} \rightarrow 4$ casos

$$\Rightarrow P = \frac{4}{6} = \frac{2}{3}$$

Rpta. C

Resolución 12

$$n(E) = 6 \times 6 = 36$$

5 en el blanco 2 en el negro

$$1 \times 1 = 1$$

$$\Rightarrow P = \frac{1}{36}$$

Rpta. E

Resolución 13

$$n(E) = 5$$

números pares: 2 $\rightarrow P = \frac{2}{5}$

Rpta. D

Resolución 14

$$n(E) = 3 \times 4 = 12$$

Casos favorables:

1° disco

2° disco

$$1 \times 1 = 1$$

$$P = \frac{1}{12}$$

Rpta. D

Resolución 15

$$n(E) = 20 + 30 = 50$$

Andrea: 1

$$P_{(A)} = \frac{1}{50}$$

Mujeres: 30

$$P_{(A)} = \frac{30}{50} = \frac{3}{5}$$

Rpta. C