



ALGEBRA

4th
SECONDARY

Práctica exploratoria



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Problema 1**Resuelva** $3x^2 - 7x + 2 = 0$

- A) $\left\{\frac{1}{3}; 2\right\}$ B) $\left\{\frac{1}{3}; -2\right\}$ C) $\left\{-\frac{1}{3}; 2\right\}$
 D) $\left\{\frac{1}{3}; 1\right\}$ E) $\left\{\frac{1}{3}; -1\right\}$

Resolución:

$$3x^2 - 7x + 2 = 0$$

$$\begin{array}{rcl} 3x & & -1 \\ x & & -2 \end{array} \begin{array}{l} \nearrow \\ \searrow \end{array} \begin{array}{l} = -x \\ = -6x \end{array}$$

$$-7x$$

$$(3x - 1)(x - 2) = 0$$

$$3x - 1 = 0 \quad \vee \quad x - 2 = 0$$

$$x_1 = \frac{1}{3} \qquad x_2 = 2$$

$$CS = \left\{\frac{1}{3}; 2\right\}$$

$$\text{Rpta: } \left\{\frac{1}{3}; 2\right\}$$

Problema 2

Si $a^3 + b^3 + c^3 = 40$ y
 $(a + b)(b + c)(a + c) = 8$,
 calcule $a + b + c$.

- A) 6 B) 4 C) 8
 D) 2 E) 5

Recordar !

$$(a + b + c)^3 \equiv a^3 + b^3 + c^3 + 3(a + b)(b + c)(a + c)$$



Resolución:

$$(a + b + c)^3 = \underbrace{a^3 + b^3 + c^3}_{40} + 3 \underbrace{(a + b)(b + c)(a + c)}_{(8)}$$

$$(a + b + c)^3 = 40 + 3(8)$$

$$(a + b + c)^3 = 64$$

$$a + b + c = 4$$

Rpta: 4

Problema 3

Si $P(2x - 1) = x^2 + 1$
 $Q(x + 3) = 4x - 1$,

calcule $P_{(7)} + Q_{(6)}$

y

C) 30

Resolución:

$$2x - 1 = 7 \rightarrow x = 4$$

$$P_{(2(4)-1)} = (4)^2 + 1$$

$$P_{(7)} = 17$$

$$x + 3 = 6 \rightarrow x = 3$$

$$Q_{((3)+3)} = 4(3) - 1$$

$$Q_{(6)} = 11$$

$$\therefore P_{(7)} + Q_{(6)} = 17 + 11$$

$$\text{Rpta: } P_{(7)} + Q_{(6)} = 28$$

Problema 4

Si $P_{(x+1)} \equiv P_{(x)} + x^2$ y $P_{(2)} = 7$,

Evalúe $P_{(5)}$

- A) 31 B) 36 C) 37
D) 41 E) 47

Resolución:

Evaluamos para $x = 2$

$$P_{(3)} = P_{(2)} + 4$$

$$P_{(3)} = 7 + 4$$

$$P_{(3)} = 11$$

Para $x = 3$

$$P_{(4)} = P_{(3)} + 9$$

$$P_{(4)} = 11 + 9$$

$$P_{(4)} = 20$$

Para $x = 4$

$$P_{(5)} = P_{(4)} + 16$$

$$P_{(5)} = 20 + 16$$

$$P_{(5)} = 36$$

Rpta: $P_{(5)} = 36$

Problema 5

Si $P_{(x)} = 2x + 1$ y $Q_{(x)} = 3x - 1$,
determine $P_{(x+1)} + Q_{(x-1)}$

- A) $5x$ B) $5x - 1$ C) $5x + 1$
D) $5x + 2$ E) $5x + 3$

Resolución:

Igualando las notaciones polinómicas

$$P_{(x)} = P_{(x+1)}$$

$$x \rightarrow x + 1$$

$$P_{(x+1)} = 2(x + 1) + 1$$

$$P_{(x+1)} = 2x + 3$$

Luego:

$$Q_{(x)} = Q_{(x-1)}$$

$$x \rightarrow x - 1$$

$$Q_{(x-1)} = 3(x - 1) - 1$$

$$Q_{(x-1)} = 3x - 4$$

$$\therefore P_{(x+1)} + Q_{(x-1)} = 2x + 3 + 3x - 4$$

Rpta: $5x - 1$

Problema 6

Sea $F_{(x)}$ un polinomio que cumple con

$$F_{(x+1)} = 3F_{(x)} - 2F_{(x-1)}$$

Además $F_{(4)} = 1$ y $F_{(6)} = 4$.

Evalúe $F_{(5)}$

A) 8
D) 1

B) 5
E) 6

C) 2

Resolución:

Evaluamos para $x = 5$

$$F_{(6)} = 3F_{(5)} - 2F_{(4)}$$

$$4 = 3F_{(5)} - 2(1)$$

$$6 = 3F_{(5)}$$

$$F_{(5)} = 2$$

Rpta: $F_{(5)} = 2$

Problema 7

Se tiene que $F(x + 3) = 2x - 1$,

determine $E = \sqrt{F(x + 1) - F(x - 1)}$

A) x

B) 2

C) $2x$

D) 1

E) $x + 1$

Resolución:**Cambio de variable**

$$x + 3 = a$$

$$x = a - 3$$

Reemplazando en el polinomio

$$F_{(a-3+3)} = 2(a - 3) - 1$$

$$F_{(a)} = 2a - 7$$

$$* F_{(x+1)} = 2(x + 1) - 7$$

$$F_{(x+1)} = 2x - 5$$

$$* F_{(x-1)} = 2(x - 1) - 7$$

$$F_{(x-1)} = 2x - 9$$

$$E = \sqrt{2x - 5 - (2x - 9)}$$

$$E = 2$$

Rpta: $E = 2$

Problema 8

Halle el valor numérico de:

$$N = (a + 1)^2 + (b + 1)^2 + 2ab - 1$$

para $a = 5 - \sqrt{3} + \sqrt{5}$ y

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

- A) 10 B) 121 C) 100
D) 200 E) 150

Recordar !

Binomio suma al cuadrado

$$(a + b)^2 = a^2 + 2ab + b^2$$

Resolución:

Del dato:

$$a = 5 - \cancel{\sqrt{3}} + \cancel{\sqrt{5}}$$

$$b = 5 + \cancel{\sqrt{3}} - \cancel{\sqrt{5}}$$

Hallamos: $a + b$

$$a + b = 10$$

Luego:

$$N = (a + 1)^2 + (b + 1)^2 + 2ab - 1$$

$$N = \underline{a^2} + 2a + \cancel{1} + \underline{b^2} + 2b + \cancel{1} + \underline{2ab} - \cancel{1}$$

$$N = \underbrace{a^2 + 2ab + b^2} + \underbrace{2a + 2b} + 1$$

$$N = (a + b)^2 + 2(a + b) + 1$$

$$N = (10)^2 + 2(10) + 1$$

$$N = 100 + 20 + 1$$

$$N = 121$$

Rpta: $N = 121$