



ALGEBRA

3th
SECONDARY

Retroalimentación

Tomo 5



 **SACO OLIVEROS**

Problema 1

Calcule el número de factores primos luego de factorizar

$$P(x) = 18x^4 + x^2 - 4$$

Resolución:



$$P(x) = 18x^4 + x^2 - 4$$

$$\begin{array}{ccc} & \overline{+x^2} & \\ 9x^2 & \nearrow & -4 \\ 2x^2 & \searrow & +1 \end{array}$$

$$P(x) = \underline{(9x^2 - 4)}(2x^2 + 1)$$

$$P(x) = (3x + 2)(3x - 2)(2x^2 + 1)$$

$\therefore P(x)$ tiene 3 factores primos

Problema 2

Indique un factor primo
luego de factorizar

$$R(x) = x^3 + x^2 - 13x + 3$$

Resolución:

$$R(x) = x^3 + x^2 - 13x + 3$$

$$a_0 = 1$$

$$a_n = 3$$

$$\text{div}(a_0) = \{1\}$$

$$\text{div}(a_n) = \{1; 3\}$$

$$PC = \pm\{1; 3\}$$

	1	1	-13	3
$x = 3$	↓	3	12	-3
×	1	4	-1	0

$$R(x) = (x - 3)(x^2 + 4x - 1)$$

Factores primos:

$$(x - 3) \text{ y } (x^2 + 4x - 1)$$

Problema 3

Calcule el número de factores primos luego de factorizar

$$Q(x) = 3x^4 + 5x^3 - 12x^2 + 8x - 8$$

Resolución:

Resolución:

$$Q(x) = 3x^4 + 5x^3 - 12x^2 + 8x - 8$$

The image shows the cost function $Q(x)$ with the term $-12x^2$ circled in a dashed purple line, indicating it is the variable cost component. The total cost is labeled TC above the circled term.

Diagram illustrating the multiplication of $(3x^2 + x^2)$ by $(-2x^2 - x + 2 - 4)$. The terms are arranged in two rows, with arrows indicating the multiplication of each term in the first row by each term in the second row. The products are shown on the right, with some terms being simplified.

Terms in the first row: $3x^2$ and x^2 .

Terms in the second row: $-2x^2$ (boxed), $-x$, $+2$, and -4 .

Products shown on the right:

- $3x^2 \cdot (-2x^2) = -6x^4$
- $3x^2 \cdot (-x) = -3x^3$
- $3x^2 \cdot (+2) = +6x^2$
- $3x^2 \cdot (-4) = -12x^2$
- $x^2 \cdot (-2x^2) = -2x^4$
- $x^2 \cdot (-x) = -x^3$
- $x^2 \cdot (+2) = +2x^2$
- $x^2 \cdot (-4) = -4x^2$

The final result is $-8x^4 - 4x^3 - 8x^2$.

$$TC = -12x^2$$

$$ST = +2x^2 - 12x^2 = -10x^2$$

$$\begin{array}{r} -12x^2 \\ -10x^2 \\ \hline -2x^2 \end{array}$$

$$Q(x) = (3x^2 - x + 2)(x^2 + 2x - 4)$$

$\therefore Q(x)$ tiene 2 factores primos.

Problema 4

Calcule:

$$A = \frac{2\sqrt{27} + \sqrt{48} + \sqrt{12}}{\sqrt{75} - \sqrt{3}}$$

Resolución:

$$A = \frac{2\sqrt{27} + \sqrt{48} + \sqrt{12}}{\sqrt{75} - \sqrt{3}}$$

$$A = \frac{2\sqrt{9}\sqrt{3} + \sqrt{16}\sqrt{3} + \sqrt{4}\sqrt{3}}{\sqrt{25}\sqrt{3} - \sqrt{3}}$$

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

$$A = \frac{6\sqrt{3} + 4\sqrt{3} + 2\sqrt{3}}{5\sqrt{3} - \sqrt{3}}$$

$$A = \frac{12\sqrt{3}}{4\sqrt{3}}$$

$$\therefore A = 3$$



Problema 5

Reduzca

$$Q = \sqrt{6 + 2\sqrt{8}} + \sqrt{5 - 2\sqrt{6}} + \sqrt{12 - 2\sqrt{27}}$$

Resolución:

$$Q = \sqrt{\underset{\substack{\downarrow \quad \downarrow \\ 4+2}}{6} + 2\sqrt{\underset{\substack{\downarrow \quad \downarrow \\ 4 \times 2}}{8}}} + \sqrt{\underset{\substack{\downarrow \quad \downarrow \\ 3+2}}{5} - 2\sqrt{\underset{\substack{\downarrow \quad \downarrow \\ 3 \times 2}}{6}}} + \sqrt{\underset{\substack{\downarrow \quad \downarrow \\ 9+3}}{12} - 2\sqrt{\underset{\substack{\downarrow \quad \downarrow \\ 9 \times 3}}{27}}}$$

$$Q = \sqrt{4} + \cancel{\sqrt{2}} + \cancel{\sqrt{3}} - \cancel{\sqrt{2}} + \sqrt{9} - \cancel{\sqrt{3}}$$

$$Q = 2 + 3$$

$$\therefore Q = 5$$

Recordemos:

$$\sqrt{A \pm \sqrt{B}} = \sqrt{(x + y) \pm 2\sqrt{xy}} = \sqrt{x} \pm \sqrt{y}$$



Problema 6

Reduzca

$$R = \frac{6}{\sqrt{8} + \sqrt{5}} + \frac{8}{3 - \sqrt{5}} - 2\sqrt{8}$$

Resolución:

$$R = \frac{6}{\sqrt{8} + \sqrt{5}} + \frac{8}{3 - \sqrt{5}} - 2\sqrt{8}$$

$$R = \frac{6}{(\sqrt{8} + \sqrt{5})} \times \frac{(\sqrt{8} - \sqrt{5})}{(\sqrt{8} - \sqrt{5})} + \frac{8}{(3 - \sqrt{5})} \times \frac{(3 + \sqrt{5})}{(3 + \sqrt{5})} - 2\sqrt{8}$$

$$R = \frac{6(\sqrt{8} - \sqrt{5})}{8 - 5} + \frac{8(3 + \sqrt{5})}{9 - 5} - 2\sqrt{8}$$

$$R = \frac{6(\sqrt{8} - \sqrt{5})}{3_1} + \frac{8(3 + \sqrt{5})}{4_1} - 2\sqrt{8}$$

$$R = \cancel{2\sqrt{8}} - \cancel{2\sqrt{5}} + 6 + \cancel{2\sqrt{5}} - \cancel{2\sqrt{8}}$$

$$\therefore R = 6$$

Problema 7

Reduzca

$$M = \frac{5i^{2325} - 7i^{7455}}{2i^{9412} - i^{5474}}; \quad (i = \sqrt{-1})$$

Recordemos:POTENCIAS DE i :

$$i^{4k} = 1$$

$$i^{4k+1} = i$$

$$i^{4k+2} = -1$$

$$i^{4k+3} = -i$$

Resolución:

$$M = \frac{5i^{2325} - 7i^{7455}}{2i^{9412} - i^{5474}}$$

$$\triangleright i^{2325} = i^{2324+1} = i^{4k+1} = i$$

$$\triangleright i^{7455} = i^{7452+3} = i^{4k+3} = -i$$

$$\triangleright i^{9412} = i^{9412} = i^{4k} = 1$$

$$\triangleright i^{5474} = i^{5472+2} = i^{4k+2} = -1$$

$$M = \frac{5(i) - 7(-i)}{2(1) - (-1)} = \frac{5i + 7i}{2 + 1} = \frac{12i}{3}$$

$$\therefore M = 4i$$

Sea $z_1 = 3 - 2i$

$z_2 = 3 - 8i$

$z_3 = 5 - 6i$

Si $z = z_1 + z_2^* + \bar{z}_3$

calcule $|z|$

Recordemos:

Sea: $z = a + bi$

Conjugado de z :

$$\bar{z} = a - bi$$

Opuesto de z :

$$z^* = -a - bi$$

Módulo de z :

$$|z| = \sqrt{a^2 + b^2}$$

Resolución:



$$z = z_1 + z_2^* + \bar{z}_3$$

$$z = (3 - 2i) + (-3 + 8i) + (5 + 6i)$$

$$z = \cancel{3} - 2i - \cancel{3} + 8i + 5 + 6i$$

$$z = 5 + 12i$$

Nos piden: $|z|$

$$|z| = \sqrt{5^2 + 12^2}$$

$$|z| = \sqrt{169}$$

$$\therefore |z| = 13$$

Problema 9

Luego de efectuar

$$z = \frac{2(3 - i)}{2 + i} + 5 - 3i$$

calcule $Re(z)$

Resolución:

$$z = \frac{2(3 - i)}{2 + i} + 5 - 3i$$

$$z = \frac{2(3 - i)(2 - i)}{(2 + i)(2 - i)} + 5 - 3i$$

$$z = \frac{2(6 - 3i - 2i + i^2)}{4 - i^2} + 5 - 3i$$

$$z = \frac{2(6 - 3i - 2i - 1)}{4 + 1} + 5 - 3i$$

$$z = \frac{2(5 - 5i)}{5} + 5 - 3i$$

$$z = \frac{2 \cdot 5(1 - i)}{5} + 5 - 3i$$

$$z = 2 - 2i + 5 - 3i$$

$$z = 7 - 5i$$

$$\therefore Re(z) = 7$$



Si $z_1 = 3 + 4i$
 $z_2 = 5 - 2i$

al efectuar

$$M = z_1^* \cdot \bar{z}_2 + 10 + 26i$$

el valor de M en soles representa el precio de 1 Kg. de azúcar. Si José compró un saco de 25 Kg, ¿cuál es el precio que pagó?

Recordemos:

Sea: $z = a + bi$

Conjugado de z :

$$\bar{z} = a - bi$$

Opuesto de z :

$$z^* = -a - bi$$

Resolución:

$$M = z_1^* \cdot \bar{z}_2 + 10 + 26i$$

$$M = (-3 - 4i)(5 + 2i) + 10 + 26i$$

$$M = -15 - 6i - 20i - 8i^2 + 10 + 26i$$

$$M = -15 - 6i - 20i + 8 + 10 + 26i$$

$$M = 3 \quad (\text{Precio de 1 Kg de azúcar en soles})$$

➡ Precio de 1 saco de 25 Kg: $25 \times 3 = 75$

$$\therefore \text{José pagó } S/. 75$$