



ALGEBRA

3th
SECONDARY

Retroalimentación

Tomo 5



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Problema 1

Calcule el número de factores primos luego de factorizar

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

Resolución:



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

$$P(x) = (9x^2 - 4)(2x^2 + 1)$$

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

$\therefore P(x)$ 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:

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

TC

$-2x^2$

$3x^2$ x^2 $-x$ $+2x$ $+2$ -4 $+2x^2$ $-12x^2$

$$TC = -12x^2$$

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

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

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

$\therefore Q(x)$ 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:

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

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

$$Q = 2 + 3$$

$$\therefore Q = 5$$

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:

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

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

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

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

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

$$\therefore R = 6$$

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:

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

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

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

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

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

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

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

$$z = 7 - 5i$$

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



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: $25 \times 3 = 75$

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