

Examen de Matemáticas 1º de Bachillerato CS
Octubre 2019

Problema 1 Simplifica todo lo que puedas

$$3\sqrt{864} - \frac{1}{2}\sqrt{1350} + 4\sqrt{4704}, \quad \frac{\sqrt{7\sqrt[3]{2}}}{\sqrt[3]{7^2 \cdot 2}}$$

Solución:

$$3\sqrt{864} - \frac{1}{2}\sqrt{1350} + 4\sqrt{4704} = \frac{281\sqrt{6}}{2}, \quad \frac{\sqrt{7\sqrt[3]{2}}}{\sqrt[3]{7^2 \cdot 2}} = \sqrt[6]{\frac{1}{14}}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{8}{7 - \sqrt{3}}; \quad \frac{5}{\sqrt[7]{3^5}}; \quad \frac{\sqrt{5}}{\sqrt{7} - \sqrt{2}}$$

Solución:

$$\frac{8}{7 - \sqrt{3}} = \frac{28 - 4\sqrt{3}}{23}; \quad \frac{5}{\sqrt[7]{3^5}} = \frac{5\sqrt[7]{9}}{3}, \quad \frac{\sqrt{5}}{\sqrt{7} - \sqrt{2}} = \frac{\sqrt{35} + \sqrt{10}}{5}$$

Problema 3 Resolver las ecuaciones:

1. $\log(7 - x) - \log(x - 1) = 1$
2. $\log(5 - x^2) - \log(2x) = 1 + \log x$
3. $2\log(2 - x) - 1 = \log(x + 1)$
4. $6^{x^2+2x-13} = 36$

Solución:

$$1. \log(7 - x) - \log(x - 1) = 1 \implies \log \frac{7 - x}{x - 1} = \log 10 \implies$$

$$11x = 17 \implies x = \frac{17}{11}.$$

$$2. \log(5 - x^2) - \log(2x) = 1 + \log x \implies \log \frac{5 - x^2}{2x} = \log(10x) \implies 21x^2 - 5 = 0 \implies x = 0, 49, \quad x = -0, 49(\text{no vale}).$$

$$3. 2\log(2 - x) - 1 = \log(x + 1) \implies x^2 - 14x - 6 = 0 \implies x = 14, 42, (\text{no vale}) \quad x = -0, 42.$$

4.

$$6^{x^2+2x-13} = 36 \implies x^2 + 2x - 15 = 0 \implies \begin{cases} x = 3 \\ x = -5 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 + 6x^2 - x - 30$

2. $Q(x) = 2x^3 - 13x^2 - 20x + 175$

3. $R(x) = x^7 - 7x^6 + 5x^5 + 33x^4 - 30x^3 - 58x^2 + 32x + 40$

Solución:

1. $P(x) = x^3 + 6x^2 - x - 30 = (x - 2)(x + 3)(x + 5)$

2. $Q(x) = 2x^3 - 13x^2 - 20x + 175 = (x - 5)^2(2x + 7)$

3. $R(x) = x^7 - 7x^6 + 5x^5 + 33x^4 - 30x^3 - 58x^2 + 32x + 40 = (x - 5)(x + 1)^2(x - 2)^2(x - \sqrt{2})(x + \sqrt{2})$

Problema 5 Resolver y simplificar:

$$\frac{5x + 2}{10} - \frac{3x + 1}{2} = 1 - \frac{x + 2}{5}$$

Solución:

$$\frac{5x + 2}{10} - \frac{3x + 1}{2} = 1 - \frac{x + 2}{5} \implies x = -\frac{9}{8}$$

Problema 6

$$x^4 - 5x^2 - 36 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 5z - 36 = 0 \implies z = 9$ y $z = -14$.

$$z = 9 = x^2 \implies x = \pm\sqrt{3}$$

$$z = -14 = x^2 \implies \text{no tiene solución}$$