

Examen de Matemáticas 1º de Bachillerato CS

Octubre 2018

Problema 1 Simplifica todo lo que puedas

$$4\sqrt{162} - \frac{1}{4}\sqrt{288} + 5\sqrt{1250}, \quad \frac{\sqrt{3\sqrt[3]{5}}}{\sqrt[4]{5^3 \cdot 3}}$$

Solución:

$$4\sqrt{162} - \frac{1}{4}\sqrt{288} + 5\sqrt{1250} = 158\sqrt{2}, \quad \frac{\sqrt{3\sqrt[3]{5}}}{\sqrt[4]{5^3 \cdot 3}} = \sqrt[12]{\frac{3^3}{5^7}}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{2}{5 - \sqrt{2}}; \quad \frac{4}{\sqrt[5]{3^2}}; \quad \frac{\sqrt{7}}{\sqrt{5} - \sqrt{2}}$$

Solución:

$$\frac{2}{5 - \sqrt{2}} = \frac{10 + 2\sqrt{2}}{23}; \quad \frac{4}{\sqrt[5]{3^2}} = \frac{4\sqrt[5]{27}}{3}, \quad \frac{\sqrt{7}}{\sqrt{5} - \sqrt{2}} = \frac{\sqrt{35} + \sqrt{14}}{3}$$

Problema 3 Resolver las ecuaciones:

1. $\log(5 - x) - \log(x + 1) = 2$
2. $\log(3 - x^2) - \log x = 1 + \log(x - 2)$
3. $2\log(2 - x) - 1 = \log(x - 3)$
4. $5^{x^2 - 11x + 26} = 25$

Solución:

1. $\log(5 - x) - \log(x + 1) = 2 \implies \log \frac{5 - x}{x + 1} = \log 100 \implies 101x = -95 \implies x = -\frac{95}{101}.$
2. $\log(3 - x^2) - \log x = 1 + \log(x - 2) \implies \log \frac{3 - x^2}{x} = \log 10(x - 2) \implies 11x^2 + 20x - 3 = 0 \implies x = 0, 14, \quad x = -1, 96(\text{no vale}).$
3. $2\log(2 - x) - 1 = \log(x - 3) \implies x^2 - 14x + 34 = 0 \implies x = 10, 87, (\text{no vale}) \quad x = 3, 13(\text{no vale}).$

4.

$$5^{x^2-11x+26} = 25 \implies x^2 - 11x + 24 = 0 \implies \begin{cases} x = 3 \\ x = 8 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 6x^2 - 9x + 14$

2. $Q(x) = x^3 - 11x^2 + 35x - 25$

3. $R(x) = 3x^6 - 20x^5 + 42x^4 - 20x^3 - 33x^2 + 40x - 12$

Solución:

1. $P(x) = x^3 - 6x^2 - 9x + 14 = (x - 1)(x + 2)(x - 7)$

2. $Q(x) = x^3 - 11x^2 + 35x - 25 = (x - 1)(x - 5)^2$

3. $R(x) = 3x^6 - 20x^5 + 42x^4 - 20x^3 - 33x^2 + 40x - 12 = (x - 1)^2(x + 1)(x - 2)(x - 3)(3x - 2)$

Problema 5 Resolver y simplificar:

$$\frac{x-3}{6} - \frac{1-x}{15} = 1 - \frac{x-1}{30}$$

Solución:

$$\frac{x-3}{6} - \frac{1-x}{15} = 1 - \frac{x-1}{30} \implies x = 6$$

Problema 6

$$x^4 - 6x^2 - 7 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 6z - 7 = 0 \implies z = 7$ y $z = -1$.

$$z = 7 = x^2 \implies x = \pm\sqrt{7}$$

$$z = -1 = x^2 \implies \text{no tiene solución}$$