

Examen de Matemáticas 1º de Bachillerato CS
Octubre 2020

Problema 1 Simplifica todo lo que puedas

$$5\sqrt{500} + \frac{1}{3}\sqrt{405} + 2\sqrt{6125}, \quad \frac{\sqrt[3]{3^2\sqrt{7}}}{\sqrt[4]{3 \cdot 7^2}}$$

Solución:

$$5\sqrt{500} + \frac{1}{3}\sqrt{405} + 2\sqrt{6125} = 117\sqrt{5}, \quad \frac{\sqrt[3]{3^2\sqrt{7}}}{\sqrt[4]{3 \cdot 7^2}} = \sqrt[12]{\frac{3^5}{7^4}}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{7}{3 - \sqrt{2}}; \quad \frac{10}{\sqrt[5]{5^2}}, \quad \frac{\sqrt{5}}{\sqrt{7} + \sqrt{2}}$$

Solución:

$$\frac{7}{3 - \sqrt{2}} = 3 + \sqrt{2}; \quad \frac{10}{\sqrt[5]{5^2}} = 2\sqrt[5]{5^3}, \quad \frac{\sqrt{5}}{\sqrt{3} + \sqrt{2}} = \frac{3 - \sqrt{6}}{5}$$

Problema 3 Resolver las ecuaciones:

1. $\log(3 - x) - \log x = 1$
2. $\log(2 - x^2) - \log(x - 1) = 1 + \log x$
3. $2\log(2 + x) - 1 = \log(x + 1)$
4. $5^{x^2+6x-25} = 25$

Solución:

1. $\log(3 - x) - \log x = 1 \implies \log \frac{3 - x}{x} = \log 10 \implies$

$$11x = 3 \implies x = \frac{3}{11}.$$

2. $\log(2 - x^2) - \log(x - 1) = 1 + \log x \implies \log \frac{2 - x^2}{x - 1} = \log 10x \implies$
 $11x^2 - 10x - 2 = 0 \implies x = 1,0778, \quad x = -0,169(\text{no vale}).$

3. $2\log(2 + x) - 1 = \log(x + 1) \implies x^2 - 6x - 6 = 0 \implies x = 6,873,$
 $x = -0,873(\text{no vale}).$

4.

$$5^{x^2+6x-25} = 25 \implies x^2 + 6x - 27 = 0 \implies \begin{cases} x = -9 \\ x = 3 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 + 4x^2 - 39x + 54$

2. $Q(x) = 2x^3 + 9x^2 + 4x - 15$

3. $R(x) = x^6 - 22x^5 + 187x^4 - 772x^3 + 1591x^2 - 1510x + 525$

Solución:

1. $P(x) = x^3 + 4x^2 - 39x + 54 = (x - 2)(x - 3)(x + 9)$

2. $Q(x) = 2x^3 + 9x^2 + 4x - 15 = (x - 1)(x + 3)(2x + 5)$

3. $R(x) = x^6 - 22x^5 + 187x^4 - 772x^3 + 1591x^2 - 1510x + 525 = (x - 1)^2(x - 3)(x - 5)^2(x - 7)$

Problema 5 Resolver y simplificar:

$$\frac{3x + 2}{5} - \frac{1 - 2x}{3} = 2 - \frac{x + 3}{30}$$

Solución:

$$\frac{3x + 2}{5} - \frac{1 - 2x}{3} = 2 - \frac{x + 3}{30} \implies x = \frac{55}{39}$$

Problema 6

$$x^4 - 12x^2 + 35 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 12z + 35 = 0 \implies z = 5$ y $z = 7$.

$$z = 5 = x^2 \implies x = \pm\sqrt{5}$$

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