

Examen de Matemáticas 1º de Bachillerato CS

Octubre 2017

Problema 1 Simplifica todo lo que puedas

$$2\sqrt{135} - \frac{3}{4}\sqrt{320} + \sqrt{3125}, \quad \frac{\sqrt{2\sqrt{7}}}{\sqrt[3]{7^2}}$$

Solución:

$$2\sqrt{135} - \frac{3}{4}\sqrt{320} + \sqrt{3125} = 6\sqrt{15} + 19\sqrt{5}, \quad \frac{\sqrt{2\sqrt{7}}}{\sqrt[3]{7^2}} = \sqrt[12]{\frac{2^6}{7^5}}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{1}{3 - \sqrt{6}}; \quad \frac{5}{\sqrt[7]{3^3}}; \quad \frac{\sqrt{5}}{\sqrt{5} - \sqrt{3}}$$

Solución:

$$\frac{1}{3 - \sqrt{6}} = \frac{3 + \sqrt{6}}{3}; \quad \frac{3}{\sqrt[7]{3^3}} = \frac{5\sqrt[7]{81}}{3}, \quad \frac{\sqrt{5}}{\sqrt{5} - \sqrt{3}} = \frac{5 + \sqrt{15}}{2}$$

Problema 3 Resolver las ecuaciones:

1. $\log(7 - x) - \log(x + 2) = 1$
2. $\log(5 - x^2) - \log x = 1 + \log(x - 1)$
3. $2\log(3 - x) - 1 = \log(x - 2)$
4. $4^{3x^2+x-3} = 16$

Solución:

$$1. \log(7 - x) - \log(x + 2) = 1 \implies \log \frac{7 - x}{x + 2} = \log 10 \implies$$

$$11x = -13 \implies x = -\frac{13}{11}.$$

$$2. \log(5 - x^2) - \log x = 1 + \log(x - 1) \implies \log \frac{5 - x^2}{x} = \log 10(x - 1) \implies \\ 11x^2 - 10x - 5 = 0 \implies x = 1,268, \quad x = -0,359(\text{no vale}).$$

$$3. 2\log(3 - x) - 1 = \log(x - 2) \implies x^2 - 16x + 29 = 0 \implies x = \\ 13,916, (\text{no vale}) \quad x = 2,083.$$

4.

$$4^{3x^2+x-3} = 16 \implies 3x^2 + x - 5 = 0 \implies \begin{cases} x = 1, 135 \\ x = -1, 468 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 6x^2 + 3x + 10$

2. $Q(x) = x^3 + 13x^2 + 35x - 49$

3. $R(x) = 2x^5 - 15x^4 + 25x^3 + 5x^2 - 27x + 10$

Solución:

1. $P(x) = x^3 - 6x^2 + 3x + 10 = (x + 1)(x - 2)(x - 5)$

2. $Q(x) = x^3 + 13x^2 + 35x - 49 = (x - 1)(x + 7)^2$

3. $R(x) = 2x^5 - 15x^4 + 25x^3 + 5x^2 - 27x + 10 = (x - 1)(x + 1)(x - 2)(x - 5)(2x - 1)$

Problema 5 Resolver y simplificar:

$$\frac{x-5}{4} - \frac{x-1}{9} = 1 - \frac{x+2}{12}$$

Solución:

$$\frac{x-5}{4} - \frac{x-1}{9} = 1 - \frac{x+2}{12} \implies x = \frac{71}{8}$$

Problema 6

$$x^4 - 7x^2 + 10 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 7z + 10 = 0 \implies z = 5$ y $z = 2$.

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

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