

Examen de Matemáticas 1º de Bachillerato CS

Octubre 2017

Problema 1 Simplifica todo lo que puedas

$$2\sqrt{675} - \frac{2}{27}\sqrt{2187} + 5\sqrt{75}, \quad \frac{\sqrt{3\sqrt{6}}}{\sqrt[3]{4}}$$

Solución:

$$2\sqrt{675} - \frac{2}{27}\sqrt{2187} + 5\sqrt{75} = 53\sqrt{3}, \quad \frac{\sqrt{3\sqrt{6}}}{\sqrt[3]{4}} = \sqrt[12]{\frac{3^9}{2^5}}$$

Problema 2 Racionalizar las siguientes expresiones:

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

Solución:

$$\frac{1}{5 - \sqrt{3}} = \frac{5 + \sqrt{3}}{22}; \quad \frac{7}{\sqrt[5]{5^3}} = \frac{7\sqrt[5]{25}}{5}, \quad \frac{\sqrt{3}}{\sqrt{7} - \sqrt{3}} = \frac{\sqrt{21} + 3}{4}$$

Problema 3 Resolver las ecuaciones:

1. $\log(2 - x) - \log(x + 3) = 1$
2. $\log(9 - x^2) - \log x = 1 + \log(x - 5)$
3. $2\log(4 - x) - 1 = \log(x - 2)$
4. $3^{2x^2+x-7} = 9$

Solución:

$$1. \log(2 - x) - \log(x + 3) = 1 \implies \log \frac{2 - x}{x + 3} = \log 10 \implies$$

$$11x = -28 \implies x = -\frac{28}{11}.$$

$$2. \log(9 - x^2) - \log x = 1 + \log(x - 5) \implies \log \frac{9 - x^2}{x} = \log 10(x - 5) \implies \\ 11x^2 - 50x - 9 = 0 \implies x = 4,719, \quad x = -0,173(\text{no vale}).$$

$$3. 2\log(4 - x) - 1 = \log(x - 2) \implies x^2 - 18x + 36 = 0 \implies x = 2,292, \\ x = 15,708(\text{no vale}).$$

4.

$$3^{2x^2+x-7} = 9 \implies 2x^2 + x - 9 = 0 \implies \begin{cases} x = 1,886 \\ x = -2,386 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 + x^2 - 17x + 15$

2. $Q(x) = x^3 - 8x^2 + 5x + 50$

3. $R(x) = 3x^5 + 5x^4 - 14x^3 - 2x^2 + 11x - 3$

Solución:

1. $P(x) = x^3 + x^2 - 17x + 15 = (x - 1)(x - 3)(x + 5)$

2. $Q(x) = x^3 - 8x^2 + 5x + 50 = (x + 2)(x - 5)^2$

3. $R(x) = 3x^5 + 5x^4 - 14x^3 - 2x^2 + 11x - 3 = (x - 1)^2(x + 1)(x + 3)(3x - 1)$

Problema 5 Resolver y simplificar:

$$\frac{x - 2}{5} - \frac{x + 3}{20} = 1 - \frac{x - 1}{10}$$

Solución:

$$\frac{x - 2}{5} - \frac{x + 3}{20} = 1 - \frac{x - 1}{10} \implies x = \frac{33}{5}$$

Problema 6

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

Solución:

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

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

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