

Examen de Matemáticas 1º de Bachillerato CN

Octubre 2012

Problema 1 Simplifica todo lo que puedas

$$2\sqrt{75} - \frac{1}{3}\sqrt{147} + 5\sqrt{81}, \quad \frac{\sqrt{5\sqrt[3]{3}}}{\sqrt[3]{5}}$$

Solución:

$$2\sqrt{75} - \frac{1}{3}\sqrt{147} + 5\sqrt{81} = \frac{23\sqrt{3}}{3} + 45, \quad \frac{\sqrt{5\sqrt[3]{3}}}{\sqrt[3]{5}} = \sqrt[6]{15}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{1}{1 + \sqrt{3}}; \quad \frac{2}{\sqrt[6]{2^5}}; \quad \frac{\sqrt{3}}{\sqrt{2} - \sqrt{5}}$$

Solución:

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

Problema 3 Resolver las ecuaciones:

1. $\log(8 - x) - \log(x + 2) = 1$
2. $\log(3 - x^2) - \log x = 1 + \log(x - 2)$
3. $2\log(2 - x) - 1 = \log x$
4. $3^{x^2+5x+2} = 27$

Solución:

$$1. \log(8 - x) - \log(x + 2) = 1 \implies \log \frac{8 - x}{x + 2} = \log 10 \implies$$

$$11x = -12 \implies x = -\frac{12}{11}.$$

$$2. \log(3 - x^2) - \log x = 1 + \log(x - 2) \implies \log \frac{3 - x^2}{x} = \log 10(x - 2) \implies \\ 11x^2 - 20x - 3 = 0 \implies x = 1,957505690, \quad x = -0,1393238722(\text{no vale}).$$

$$3. 2\log(2 - x) - 1 = \log x \implies x^2 - 14x + 4 = 0 \implies x = 0,292, \quad x = 13,708(\text{no vale}).$$

4.

$$3^{x^2+5x+2} = 27 \implies x^2 + 5x - 1 = 0 \implies \begin{cases} x = 0, 1925824035 \\ x = -5, 192582403 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 5x^2 - x + 5$
2. $Q(x) = x^3 - 7x^2 + 11x - 5$
3. $R(x) = 5x^5 + 22x^4 - 2x^3 - 64x^2 + 21x + 18$

Solución:

1. $P(x) = x^3 - 5x^2 - x + 5 = (x - 1)(x + 1)(x - 5)$
2. $Q(x) = x^3 - 7x^2 + 11x - 5 = (x - 5)(x - 1)^2$
3. $R(x) = 5x^5 + 22x^4 - 2x^3 - 64x^2 + 21x + 18 = (x - 1)^2(x + 3)^2(5x + 2)$

Problema 5 Resolver y simplificar:

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

Solución:

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

Problema 6

$$x^4 - 3x^2 + 2 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 3z + 2 = 0 \implies z = 1$ y $z = 2$.

$$z = 1 = x^2 \implies x = \pm 1$$

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