

Examen de Matemáticas 1º de Bachillerato CS
Octubre 2012

Problema 1 Simplifica todo lo que puedas

$$3\sqrt{80} + \frac{1}{5}\sqrt{45} - 4\sqrt{125}, \quad \frac{\sqrt[3]{2\sqrt{5}}}{\sqrt{5}}$$

Solución:

$$3\sqrt{80} + \frac{1}{5}\sqrt{45} - 4\sqrt{125} = -\frac{37\sqrt{5}}{5}, \quad \frac{\sqrt[3]{2\sqrt{5}}}{\sqrt{5}} = \sqrt[6]{\frac{4}{25}}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{1}{2 - \sqrt{5}}; \quad \frac{5}{\sqrt[7]{5^2}}; \quad \frac{\sqrt{3}}{\sqrt{5} - \sqrt{2}}$$

Solución:

$$\frac{1}{2 - \sqrt{5}} = -(2 + \sqrt{5}); \quad \frac{5}{\sqrt[7]{5^2}} = \sqrt[7]{3125}, \quad \frac{\sqrt{3}}{\sqrt{5} - \sqrt{2}} = \frac{\sqrt{15} + \sqrt{6}}{3}$$

Problema 3 Resolver las ecuaciones:

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

Solución:

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

$$x^2 - 8x + 1 = 0 \implies x = 7,87 \quad x = 0,13.$$

2. $\log(x + 5) - 2 = \log(x - 1) \implies \log \frac{x + 5}{100} = \log(x - 1) \implies$

$$99x = 105 \implies x = 105/99 = 35/33.$$

3. $\log(5x + 4) - 1 = \log x \implies \log \frac{5x - 4}{10} = \log x \implies$

$$5x = 4 \implies x = 4/5$$

4.

$$2^{x^2-4x-2} = 16 \implies x^2 - 4x - 6 = 0 \implies \begin{cases} x = 5, 162277660 \\ x = -1, 162277660 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 4x^2 + x + 6$

2. $Q(x) = x^3 - 9x^2 + 15x - 7$

3. $R(x) = 4x^5 + 5x^4 - 18x^3 - 7x^2 + 28x - 12$

Solución:

1. $P(x) = x^3 - 4x^2 + x + 6 = (x - 2)(x + 1)(x - 3)$

2. $Q(x) = x^3 - 9x^2 + 15x - 7 = (x - 7)(x - 1)^2$

3. $R(x) = 4x^5 + 5x^4 - 18x^3 - 7x^2 + 28x - 12 = (x - 1)^2(x + 2)^2(4x - 3)$

Problema 5 Resolver y simplificar:

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

Solución:

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

Problema 6

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

Solución:

Hacemos $z = x^2 \implies z^2 - 4z + 3 = 0 \implies z = 1$ y $z = 3$.

$$z = 3 = x^2 \implies x = \pm\sqrt{3}$$

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