

Examen de Matemáticas 1º de Bachillerato CS
Octubre 2015

Problema 1 Simplifica todo lo que puedas

$$3\sqrt{320} - \frac{4}{3}\sqrt{405} + 4\sqrt{245}, \quad \frac{\sqrt{2\sqrt[3]{6}}}{\sqrt[3]{2}}$$

Solución:

$$3\sqrt{320} - \frac{4}{3}\sqrt{405} + 4\sqrt{245} = 40\sqrt{5}, \quad \frac{\sqrt{2\sqrt[3]{6}}}{\sqrt[3]{2}} = \sqrt[6]{12}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{1}{4 - \sqrt{3}}; \quad \frac{5}{\sqrt[7]{2^3}}, \quad \frac{\sqrt{5}}{\sqrt{7} - \sqrt{2}}$$

Solución:

$$\frac{1}{4 - \sqrt{3}} = \frac{4 + \sqrt{3}}{13}; \quad \frac{5}{\sqrt[7]{2^3}} = \frac{5\sqrt[7]{2^4}}{2}, \quad \frac{\sqrt{5}}{\sqrt{7} - \sqrt{2}} = \frac{\sqrt{35} + \sqrt{10}}{5}$$

Problema 3 Resolver las ecuaciones:

1. $2\log(x + 5) - 2 = \log(x + 2)$
2. $\log(x + 2) - 1 = \log(x + 3)$
3. $\log(3x + 7) - 1 = \log x$
4. $5^{x^2 - x - 3} = 125$

Solución:

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

$$x^2 - 90x - 175 = 0 \implies x = 91,9 \quad x = -1,9.$$

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

$$9x = 12 \implies x = -28/9 \text{ No vale.}$$

$$3. \quad \log(3x + 7) - 1 = \log x \implies \log \frac{3x + 7}{10} = \log x \implies x = 1$$

4.

$$5^{x^2-x-3} = 125 \implies x^2 + x - 6 = 0 \implies \begin{cases} x = 3 \\ x = -2 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 11x^2 + 26x - 16$

2. $Q(x) = x^3 + 3x^2 - 13x - 15$

3. $R(x) = 2x^4 + 7x^3 - 6x^2 - 25x - 14$

Solución:

1. $P(x) = x^3 - 11x^2 + 26x - 16 = (x - 1)(x - 2)(x - 8)$

2. $Q(x) = x^3 + 3x^2 - 13x - 15 = (x + 1)(x - 3)(x + 5)$

3. $R(x) = 2x^4 + 7x^3 - 6x^2 - 25x - 14 = (x + 1)^2(x - 2)(2x + 7)$

Problema 5 Resolver y simplificar:

$$\frac{3x - 5}{25} - \frac{x - 1}{15} = 1 - \frac{x + 2}{10}$$

Solución:

$$\frac{3x - 5}{25} - \frac{x - 1}{15} = 1 - \frac{x + 2}{10} \implies x = \frac{140}{23}$$

Problema 6

$$x^4 - 40x^2 + 144 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 40z + 144 = 0 \implies z = 36$ y $z = 4$.

$$z = 36 = x^2 \implies x = \pm 6$$

$$z = 4 = x^2 \implies x = \pm 2$$