

Examen de Matemáticas 1º de Bachillerato CS

Octubre 2013

Problema 1 Simplifica todo lo que puedas

$$2\sqrt{567} + \frac{1}{7}\sqrt{343} - 4\sqrt{112}, \quad \frac{\sqrt[3]{5\sqrt{11}}}{\sqrt{5}}$$

Solución:

$$2\sqrt{567} + \frac{1}{7}\sqrt{343} - 4\sqrt{112} = 3\sqrt{7}, \quad \frac{\sqrt[3]{5\sqrt{11}}}{\sqrt{5}} = \sqrt[6]{\frac{11}{5}}$$

Problema 2 Racionalizar las siguientes expresiones:

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

Solución:

$$\frac{1}{3 - \sqrt{2}} = \frac{3 + \sqrt{2}}{7}; \quad \frac{7}{\sqrt[7]{7^5}} = \sqrt[7]{49}, \quad \frac{\sqrt{5}}{\sqrt{7} - \sqrt{2}} = \frac{\sqrt{35} + \sqrt{10}}{5}$$

Problema 3 Resolver las ecuaciones:

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

Solución:

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

$$x^2 - 6x - 6 = 0 \implies x = 6,872983346 \quad x = -0,8729833462.$$

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

$$99x = 95 \implies x = -95/99.$$

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

$$7x = 7 \implies x = 1$$

4.

$$2^{x^2+2x+1} = 16 \implies x^2 + 2x - 3 = 0 \implies \begin{cases} x = 1 \\ x = -3 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 8x^2 + 17x - 10$

2. $Q(x) = x^3 - 12x^2 + 41x - 42$

3. $R(x) = 5x^5 - 31x^4 + 71x^3 - 73x^2 + 32x - 4$

Solución:

1. $P(x) = x^3 - 8x^2 + 17x - 10 = (x - 1)(x - 2)(x - 5)$

2. $Q(x) = x^3 - 12x^2 + 41x - 42 = (x - 2)(x - 3)(x - 7)$

3. $R(x) = 5x^5 - 31x^4 + 71x^3 - 73x^2 + 32x - 4 = (x - 1)^2(x - 2)^2(5x - 1)$

Problema 5 Resolver y simplificar:

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

Solución:

$$\frac{x-2}{x-3} - \frac{x-1}{x^2+2x-15} = \frac{x}{x+5} \implies x = \frac{9}{5}$$

Problema 6

$$x^4 - 17x^2 + 16 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 17z + 16 = 0 \implies z = 16$ y $z = 1$.

$$z = 16 = x^2 \implies x = \pm 4$$

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