

Examen de Matemáticas 1º de Bachillerato CS
Octubre 2014

Problema 1 Simplifica todo lo que puedas

$$6\sqrt{72} - \frac{1}{5}\sqrt{450} + 2\sqrt{98}, \quad \frac{\sqrt[3]{7\sqrt{11}}}{\sqrt{7}}$$

Solución:

$$6\sqrt{72} - \frac{1}{5}\sqrt{450} + 2\sqrt{98} = 47\sqrt{2}, \quad \frac{\sqrt[3]{7\sqrt{11}}}{\sqrt{7}} = \sqrt[6]{\frac{11}{7}}$$

Problema 2 Racionalizar las siguientes expresiones:

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

Solución:

$$\frac{5}{7 - \sqrt{2}} = \frac{35 + 5\sqrt{2}}{47}; \quad \frac{7}{\sqrt[7]{3^2}} = \frac{7\sqrt[7]{3^5}}{3}, \quad \frac{\sqrt{5}}{\sqrt{7} - \sqrt{2}} = \frac{\sqrt{35} + \sqrt{10}}{5}$$

Problema 3 Resolver las ecuaciones:

1. $2\log(x + 7) - 2 = \log(x + 1)$
2. $\log(x + 2) - 1 = \log(x - 1)$
3. $\log(2x + 5) - 1 = \log x$
4. $3^{x^2+2x+1} = 81$

Solución:

1. $2\log(x + 7) - 2 = \log(x + 1) \implies \log \frac{(x + 7)^2}{100} = \log(x + 1) \implies$

$$x^2 - 86x - 51 = 0 \implies x = 86,58898943 \quad x = -0,5889894353.$$

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

$$9x = 12 \implies x = 4/3.$$

3. $\log(2x + 5) - 1 = \log x \implies \log \frac{2x + 5}{10} = \log x \implies$

$$8x = 5 \implies x = 5/8$$

4.

$$3^{x^2+2x+1} = 81 \implies x^2 + 2x - 3 = 0 \implies \begin{cases} x = 1 \\ x = -3 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 14x^2 + 59x - 70$

2. $Q(x) = x^3 - 14x^2 + 55x - 42$

3. $R(x) = 3x^5 - 28x^4 + 101x^3 - 176x^2 + 148x - 48$

Solución:

1. $P(x) = x^3 - 14x^2 + 59x - 70 = (x - 2)(x - 5)(x - 7)$

2. $Q(x) = x^3 - 14x^2 + 55x - 42 = (x - 1)(x - 6)(x - 7)$

3. $R(x) = 3x^5 - 28x^4 + 101x^3 - 176x^2 + 148x - 48 = (x - 1)(x - 2)^2(x - 3)(3x - 4)$

Problema 5 Resolver y simplificar:

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

Solución:

$$\frac{2x - 1}{15} - \frac{x - 2}{25} = 1 - \frac{x - 1}{10} \implies x = \frac{163}{29}$$

Problema 6

$$x^4 - 25x^2 + 144 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 25z + 144 = 0 \implies z = 16$ y $z = 9$.

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

$$z = 9 = x^2 \implies x = \pm 3$$