Examen de Matemáticas 1º de Bachillerato CS
Octubre 2019

Problema 1 Simplifica todo lo que puedas

$$3\sqrt{200} + \frac{1}{3}\sqrt{648} - 5\sqrt{2450}, \quad \frac{\sqrt[3]{5^2\sqrt{3}}}{\sqrt[4]{5 \cdot 3^2}}$$

Solución:

$$3\sqrt{200} + \frac{1}{3}\sqrt{648} - 5\sqrt{2450} = -139\sqrt{2}, \quad \frac{\sqrt[3]{5^2\sqrt{3}}}{\sqrt[4]{5 \cdot 3^2}} = \sqrt[12]{\frac{5^5}{3^4}}$$

Problema 2 Racionalizar las siguientes expresiones:

$$\frac{4}{3 - \sqrt{5}}; \quad \frac{6}{\sqrt[5]{3^2}}, \quad \frac{\sqrt{5}}{\sqrt{7} + \sqrt{2}}$$

Solución:

$$\frac{4}{3 - \sqrt{5}} = 3 + \sqrt{5}; \quad \frac{6}{\sqrt[5]{3^2}} = 2\sqrt[5]{3^3}, \quad \frac{\sqrt{5}}{\sqrt{7} + \sqrt{2}} = \frac{\sqrt{37} - \sqrt{10}}{5}$$

Problema 3 Resolver las ecuaciones:

1. $\log(5 - x) - \log x = 1$

2. $\log(6 - x^2) - \log(x - 1) = 1 + \log x$

3. $2\log(1 + x) - 1 = \log(x + 3)$

4. $5^{x^2 - 6x - 5} = 25$

Solución:

1. $\log(5 - x) - \log x = 1 \Longrightarrow \log \dfrac{5 - x}{x} = \log 10 \Longrightarrow$

   $11x = 5 \Longrightarrow x = \dfrac{5}{11}$.

2. $\log(6 - x^2) - \log(x - 1) = 1 + \log x \Longrightarrow \log \dfrac{6 - x^2}{x - 1} = \log 10x \Longrightarrow$
   $11x^2 - 10x - 6 = 0 \Longrightarrow x = 1,32, \quad x = -0,41(\text{no vale}).$

3. $2\log(1 + x) - 1 = \log(x + 3) \Longrightarrow x^2 - 8x - 29 = 0 \Longrightarrow x = 10,71,$
   $x = -2,71(\text{no vale}).$

4.
$$5^{x^2-6x-5} = 25 \implies x^2 - 6x - 7 = 0 \implies \begin{cases} x = -1 \\ x = 7 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

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

2. $Q(x) = x^3 - 16x^2 + 77x - 98$

3. $R(x) = 2x^6 - 11x^5 + 11x^4 + 23x^3 - 29x^2 - 16x + 12$

Solución:

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

2. $Q(x) = x^3 - 16x^2 + 77x - 98 = (x-7)^2(x-2)$

3. $R(x) = 2x^6 - 11x^5 + 11x^4 + 23x^3 - 29x^2 - 16x + 12 = (x+1)^2(x-2)^2(x-3)(2x-1)$

Problema 5 Resolver y simplificar:
$$\frac{2x-1}{5} - \frac{1-x}{3} = 2 - \frac{x+3}{30}$$

Solución:
$$\frac{2x-1}{5} - \frac{1-x}{3} = 2 - \frac{x+3}{30} \implies x = \frac{73}{23}$$

Problema 6
$$x^4 - 9x^2 + 14 = 0$$

Solución:

Hacemos $z = x^2 \implies z^2 - 9z + 14 = 0 \implies z = 2$ y $z = 7$.

$$z = 2 = x^2 \implies x = \pm\sqrt{2}$$
$$z = 7 = x^2 \implies x = \pm\sqrt{7}$$