

## Examen de Matemáticas 1º de Bachillerato CS

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**Problema 1** Simplifica todo lo que puedas

$$\sqrt{720} - \frac{2}{5}\sqrt{24500} + \sqrt{14580}, \quad \frac{\sqrt{2\sqrt[3]{7}}}{\sqrt[3]{7\sqrt{2}}}$$

**Solución:**

$$\sqrt{720} - \frac{2}{5}\sqrt{24500} + \sqrt{14580} = -14\sqrt{5}, \quad \frac{\sqrt{2\sqrt[3]{7}}}{\sqrt[3]{7\sqrt{2}}} = \sqrt[6]{\frac{4}{7}}$$

**Problema 2** Racionalizar las siguientes expresiones:

$$\frac{4}{\sqrt{5}-1}; \quad \frac{4}{\sqrt[6]{2^5}}, \quad \frac{\sqrt{3}}{\sqrt{5}-\sqrt{2}}$$

**Solución:**

$$\frac{4}{\sqrt{5}-1} = \sqrt{5} + 1; \quad \frac{4}{\sqrt[6]{2^5}} = 2\sqrt[6]{2}, \quad \frac{\sqrt{3}}{\sqrt{5}-\sqrt{2}} = \frac{\sqrt{15} + \sqrt{6}}{3}$$

**Problema 3** Resolver las ecuaciones:

- a)  $\log(3-x) - \log(x+2) = 1$
- b)  $\log(2-x^2) - \log(x-2) = 1 + \log x$
- c)  $2\log(1-x) - 1 = \log(x+2)$
- d)  $5^{x^2-4x-19} = 25$

**Solución:**

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

$$11x = -17 \implies x = -\frac{17}{11}.$$

b)  $\log(2-x^2) - \log(x-2) = 1 + \log x \implies \log \frac{2-x^2}{x-2} = \log(10x) \implies 11x^2 - 20x - 2 = 0 \implies x = -0,09503281974$  (no vale),  $x = 1,913214637$ .

c)  $2\log(1-x) - 1 = \log(x+2) \implies x^2 - 12x - 19 = 0 \implies x = -1,416198487, x = 13,41619848$ , (no vale).

d)

$$5^{x^2-4x-19} = 25 \implies x^2 - 4x - 21 = 0 \implies \begin{cases} x = 7 \\ x = -3 \end{cases}$$

**Problema 4** Factoriza los siguientes polinomios:

a)  $P(x) = x^3 + 4x^2 - 11x - 30$

b)  $Q(x) = x^3 + 11x^2 + 15x - 27$

c)  $R(x) = 5x^5 - 52x^4 + 180x^3 - 254x^2 + 151x - 30$

**Solución:**

a)  $P(x) = x^3 + 4x^2 - 11x - 30 = (x + 2)(x - 3)(x + 5)$

b)  $Q(x) = x^3 + 11x^2 + 15x - 27 = (x - 1)(x + 3)(x + 9)$

c)  $R(x) = 5x^5 - 52x^4 + 180x^3 - 254x^2 + 151x - 30 = (x - 1)^2(x - 3)(x - 5)(5x - 2)$

**Problema 5** Resolver y simplificar:

$$\frac{3x - 4}{15} - \frac{2x + 1}{2} = 1 - \frac{x - 3}{3}$$

**Solución:**

$$\frac{3x - 4}{15} - \frac{2x + 1}{2} = 1 - \frac{x - 3}{3} \implies x = -\frac{83}{14}$$

**Problema 6**  $x^4 - 5x^2 + 4 = 0$

**Solución:**

Hacemos  $z = x^2 \implies z^2 - 5z + 4 = 0 \implies z = 1$  y  $z = 4$ .

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

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