

## Examen de Matemáticas 1º de Bachillerato CS

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**Problema 1** Simplifica todo lo que puedas

$$3\sqrt{96} - \frac{5}{3}\sqrt{216} + 8\sqrt{864}, \quad \frac{\sqrt[3]{3\sqrt{6}}}{\sqrt{6}}$$

**Solución:**

$$3\sqrt{96} - \frac{5}{3}\sqrt{216} + 8\sqrt{864} = 98\sqrt{6}, \quad \frac{\sqrt[3]{3\sqrt{6}}}{\sqrt{6}} = \frac{\sqrt[3]{4}}{2}$$

**Problema 2** Racionalizar las siguientes expresiones:

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

**Solución:**

$$\frac{1}{3 - \sqrt{5}} = \frac{3 + \sqrt{5}}{4}; \quad \frac{3}{\sqrt[6]{5^5}} = \frac{3\sqrt[6]{5}}{5}, \quad \frac{\sqrt{2}}{\sqrt{5} - \sqrt{3}} = \frac{\sqrt{10} + \sqrt{6}}{3}$$

**Problema 3** Resolver las ecuaciones:

1.  $\log(4 - x) - \log(x + 5) = 1$
2.  $\log(7 - x^2) - \log x = 1 + \log(x - 5)$
3.  $2\log(3 - x) - 1 = \log(x - 3)$
4.  $4^{x^2 - 10x + 18} = 16$

**Solución:**

$$1. \log(4 - x) - \log(x + 5) = 1 \implies \log \frac{4 - x}{x + 5} = \log 10 \implies$$

$$11x = -46 \implies x = -\frac{46}{11}.$$

$$2. \log(7 - x^2) - \log x = 1 + \log(x - 5) \implies \log \frac{7 - x^2}{x} = \log 10(x - 5) \implies$$

$$11x^2 - 50x - 7 = 0 \implies x = 4, 68, \text{ (no vale)} \quad x = -0, 14 \text{ (no vale)}.$$

$$3. 2\log(3 - x) - 1 = \log(x - 3) \implies x^2 - 16x + 39 = 0 \implies x =$$

$$13, \text{ (no vale)} \quad x = 3, \text{ (no vale)}.$$

4.

$$4^{x^2-10x+18} = 2 \implies x^2 - 10x + 16 = 0 \implies \begin{cases} x = 2 \\ x = 8 \end{cases}$$

**Problema 4** Factoriza los siguientes polinomios:

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

2.  $Q(x) = x^3 + 11x^2 + 24x - 36$

3.  $R(x) = 2x^5 - 11x^4 - x^3 + 37x^2 - 37x + 10$

**Solución:**

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

2.  $Q(x) = x^3 + 11x^2 + 24x - 36 = (x - 1)(x + 6)^2$

3.  $R(x) = 2x^5 - 11x^4 - x^3 + 37x^2 - 37x + 10 = (x - 1)^2(x + 2)(x - 5)(2x - 1)$

**Problema 5** Resolver y simplificar:

$$\frac{x - 7}{6} - \frac{x + 1}{8} = 1 - \frac{x + 5}{12}$$

**Solución:**

$$\frac{x - 7}{6} - \frac{x + 1}{8} = 1 - \frac{x + 5}{12} \implies x = 15$$

**Problema 6**

$$x^4 - 41x^2 + 400 = 0$$

**Solución:**

$$\text{Hacemos } z = x^2 \implies z^2 - 41z + 400 = 0 \implies z = 5 \text{ y } z = 4.$$

$$z = 5 = x^2 \implies x = \pm\sqrt{5}$$

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