

# Examen de Matemáticas 1º de Bachillerato CS

## Octubre 2012

---

**Problema 1** Simplifica todo lo que puedas

$$3\sqrt{80} + \frac{1}{5}\sqrt{45} - 4\sqrt{125}, \quad \frac{\sqrt[3]{2\sqrt{5}}}{\sqrt{5}}$$

**Solución:**

$$3\sqrt{80} + \frac{1}{5}\sqrt{45} - 4\sqrt{125} = -\frac{37\sqrt{5}}{5}, \quad \frac{\sqrt[3]{2\sqrt{5}}}{\sqrt{5}} = \sqrt[6]{\frac{4}{25}}$$

**Problema 2** Racionalizar las siguientes expresiones:

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

**Solución:**

$$\frac{1}{2 - \sqrt{5}} = -(2 + \sqrt{5}); \quad \frac{5}{\sqrt[7]{5^2}} = \sqrt[7]{3125}, \quad \frac{\sqrt{3}}{\sqrt{5} - \sqrt{2}} = \frac{\sqrt{15} + \sqrt{6}}{3}$$

**Problema 3** Resolver las ecuaciones:

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

**Solución:**

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

$$x^2 - 8x + 1 = 0 \implies x = 7, 87 \quad x = 0, 13.$$

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

$$99x = 105 \implies x = 105/99 = 35/33.$$

$$3. \quad \log(5x+4) - 1 = \log x \implies \log \frac{5x-4}{10} = \log x \implies$$

$$5x = 4 \implies x = 4/5$$

4.

$$2^{x^2-4x-2} = 16 \implies x^2 - 4x - 6 = 0 \implies \begin{cases} x = 5, 162277660 \\ x = -1, 162277660 \end{cases}$$

**Problema 4** Factoriza los siguientes polinomios:

1.  $P(x) = x^3 - 4x^2 + x + 6$
2.  $Q(x) = x^3 - 9x^2 + 15x - 7$
3.  $R(x) = 4x^5 + 5x^4 - 18x^3 - 7x^2 + 28x - 12$

**Solución:**

1.  $P(x) = x^3 - 4x^2 + x + 6 = (x - 2)(x + 1)(x - 3)$
2.  $Q(x) = x^3 - 9x^2 + 15x - 7 = (x - 7)(x - 1)^2$
3.  $R(x) = 4x^5 + 5x^4 - 18x^3 - 7x^2 + 28x - 12 = (x - 1)^2(x + 2)^2(4x - 3)$

**Problema 5** Resolver y simplificar:

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

**Solución:**

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

**Problema 6**

$$x^4 - 4x^2 + 3 = 0$$

**Solución:**

Hacemos  $z = x^2 \implies z^2 - 4z + 3 = 0 \implies z = 1 \text{ y } z = 3.$

$$z = 3 = x^2 \implies x = \pm\sqrt{3}$$

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