

**Examen de Matemáticas 1º de Bachillerato CS**  
**Octubre 2014**

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**Problema 1** Simplifica todo lo que puedas

$$5\sqrt{108} - \frac{2}{3}\sqrt{675} + 2\sqrt{147}, \quad \frac{\sqrt[3]{6\sqrt{2}}}{\sqrt[3]{6}}$$

**Solución:**

$$5\sqrt{108} - \frac{2}{3}\sqrt{675} + 2\sqrt{147} = 34\sqrt{3}, \quad \frac{\sqrt[3]{6\sqrt{2}}}{\sqrt[3]{6}} = \sqrt[6]{2}$$

**Problema 2** Racionalizar las siguientes expresiones:

$$\frac{1}{2 + \sqrt{5}}; \quad \frac{2}{\sqrt[6]{7^5}}; \quad \frac{\sqrt{3}}{\sqrt{5} - \sqrt{2}}$$

**Solución:**

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

**Problema 3** Resolver las ecuaciones:

1.  $\log(3 - x) - \log(x + 2) = 1$
2.  $\log(7 - x^2) - \log x = 1 + \log(x - 1)$
3.  $2\log(5 - x) - 1 = \log x$
4.  $5^{x^2 - 5x - 4} = 25$

**Solución:**

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

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

2.  $\log(7 - x^2) - \log x = 1 + \log(x - 1) \implies \log \frac{7 - x^2}{x} = \log 10(x - 1) \implies$   
 $11x^2 - 10x - 7 = 0 \implies x = 1, 372682267, x = -0, 4635913580$ (no vale).

3.  $2\log(5 - x) - 1 = \log x \implies x^2 - 20x + 25 = 0 \implies x = 1, 339745962, x = 18, 66025403$ (no vale).

4.

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

**Problema 4** Factoriza los siguientes polinomios:

1.  $P(x) = x^3 - 10x^2 + 23x - 14$

2.  $Q(x) = x^3 - 12x^2 + 45x - 50$

3.  $R(x) = 3x^5 - 4x^4 - 13x^3 + 18x^2 + 4x - 8$

**Solución:**

1.  $P(x) = x^3 - 10x^2 + 23x - 14 = (x - 1)(x - 2)(x - 7)$

2.  $Q(x) = x^3 - 12x^2 + 45x - 50 = (x - 2)(x - 5)^2$

3.  $R(x) = 3x^5 - 4x^4 - 13x^3 + 18x^2 + 4x - 8 = (x - 1)^2(x + 2)(x - 2)(3x + 2)$

**Problema 5** Resolver y simplificar:

$$\frac{x - 5}{8} - \frac{x - 2}{6} = 2 - \frac{x + 3}{12}$$

**Solución:**

$$\frac{x - 5}{8} - \frac{x - 2}{6} = 2 - \frac{x + 3}{12} \implies x = 49$$

**Problema 6**

$$x^4 - 13x^2 + 36 = 0$$

**Solución:**

Hacemos  $z = x^2 \implies z^2 - 13z + 36 = 0 \implies z = 9$  y  $z = 4$ .

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

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