

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

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**Problema 1** Simplifica todo lo que puedas

$$6\sqrt{72} - \frac{1}{5}\sqrt{450} + 2\sqrt{98}, \quad \frac{\sqrt[3]{7\sqrt{11}}}{\sqrt{7}}$$

**Solución:**

$$6\sqrt{72} - \frac{1}{5}\sqrt{450} + 2\sqrt{98} = 47\sqrt{2}, \quad \frac{\sqrt[3]{7\sqrt{11}}}{\sqrt{7}} = \sqrt[6]{\frac{11}{7}}$$

**Problema 2** Racionalizar las siguientes expresiones:

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

**Solución:**

$$\frac{5}{7 - \sqrt{2}} = \frac{35 + 5\sqrt{2}}{47}; \quad \frac{7}{\sqrt[7]{3^2}} = \frac{7\sqrt[7]{3^5}}{3}; \quad \frac{\sqrt{5}}{\sqrt{7} - \sqrt{2}} = \frac{\sqrt{35} + \sqrt{10}}{5}$$

**Problema 3** Resolver las ecuaciones:

1.  $2\log(x + 7) - 2 = \log(x + 1)$
2.  $\log(x + 2) - 1 = \log(x - 1)$
3.  $\log(2x + 5) - 1 = \log x$
4.  $3^{x^2+2x+1} = 81$

**Solución:**

1.  $2\log(x + 7) - 2 = \log(x + 1) \implies \log \frac{(x + 7)^2}{100} = \log(x + 1) \implies$

$$x^2 - 86x - 51 = 0 \implies x = 86,58898943 \quad x = -0,5889894353.$$

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

$$9x = 12 \implies x = 4/3.$$

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

$$8x = 5 \implies x = 5/8$$

4.

$$3^{x^2+2x+1} = 81 \implies x^2 + 2x - 3 = 0 \implies \begin{cases} x = 1 \\ x = -3 \end{cases}$$

**Problema 4** Factoriza los siguientes polinomios:

1.  $P(x) = x^3 - 14x^2 + 59x - 70$

2.  $Q(x) = x^3 - 14x^2 + 55x - 42$

3.  $R(x) = 3x^5 - 28x^4 + 101x^3 - 176x^2 + 148x - 48$

**Solución:**

1.  $P(x) = x^3 - 14x^2 + 59x - 70 = (x - 2)(x - 5)(x - 7)$

2.  $Q(x) = x^3 - 14x^2 + 55x - 42 = (x - 1)(x - 6)(x - 7)$

3.  $R(x) = 3x^5 - 28x^4 + 101x^3 - 176x^2 + 148x - 48 = (x - 1)(x - 2)^2(x - 3)(3x - 4)$

**Problema 5** Resolver y simplificar:

$$\frac{2x - 1}{15} - \frac{x - 2}{25} = 1 - \frac{x - 1}{10}$$

**Solución:**

$$\frac{2x - 1}{15} - \frac{x - 2}{25} = 1 - \frac{x - 1}{10} \implies x = \frac{163}{29}$$

**Problema 6**

$$x^4 - 25x^2 + 144 = 0$$

**Solución:**

Hacemos  $z = x^2 \implies z^2 - 25z + 144 = 0 \implies z = 16$  y  $z = 9$ .

$$z = 16 = x^2 \implies x = \pm 4$$

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