

Exámen de matemáticas 1º de Bachiller CC SS

Problema 1 Simplifica todo lo que puedas

$$2\sqrt{75} - \frac{1}{3}\sqrt{147} + 5\sqrt{81}, \quad \frac{\sqrt{5}\sqrt[3]{3}}{\sqrt[3]{5}}$$

Solución:

$$2\sqrt{75} - \frac{1}{3}\sqrt{147} + 5\sqrt{81} = \frac{23\sqrt{3}}{3} + 45, \quad \frac{\sqrt{5}\sqrt[3]{3}}{\sqrt[3]{5}} = \sqrt[6]{15}$$

Problema 2 Racionalizar las siguientes expresiones:

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

Solución:

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

Problema 3 Resolver las ecuaciones:

1. $\log(8-x) - \log(x+2) = 1$
2. $\log(3-x^2) - \log x = 1 + \log(x-2)$
3. $2\log(2-x) - 1 = \log x$
4. $3^{x^2+5x+2} = 27$

Solución:

1. $\log(8-x) - \log(x+2) = 1 \implies \log \frac{8-x}{x+2} = \log 10 \implies 8-x = 10(x+2) \implies 8-x = 10x+20 \implies 11x = -12 \implies x = -\frac{12}{11}$
2. $\log(3-x^2) - \log x = 1 + \log(x-2) \implies \log \frac{3-x^2}{x} = \log 10(x-2) \implies \frac{3-x^2}{x} = 10(x-2) \implies 3-x^2 = 10x^2-20x \implies 11x^2-20x-3=0 \implies x = 1,957505690, x = -0,1393238722(\text{no vale}).$
3. $2\log(2-x) - 1 = \log x \implies \log(2-x)^2 - 1 = \log x \implies \log(4-4x+x^2) - 1 = \log x \implies 4-4x+x^2 = 10x \implies x^2-14x+4=0 \implies x = 0,292, x = 13,708(\text{no vale}).$

4.

$$3^{x^2+5x+2} = 27 \implies x^2 + 5x - 1 = 0 \implies \begin{cases} x = 0, 1925824035 \\ x = -5, 192582403 \end{cases}$$

Problema 4 Factoriza los siguientes polinomios:

1. $P(x) = x^3 - 5x^2 - x + 5$
2. $Q(x) = x^3 - 7x^2 + 11x - 5$
3. $R(x) = 5x^5 + 22x^4 - 2x^3 - 64x^2 + 21x + 18$

Solución:

1. $P(x) = x^3 - 5x^2 - x + 5 = (x - 1)(x + 1)(x - 5)$
2. $Q(x) = x^3 - 7x^2 + 11x - 5 = (x - 5)(x - 1)^2$
3. $R(x) = 5x^5 + 22x^4 - 2x^3 - 64x^2 + 21x + 18 = (x - 1)^2(x + 3)^2(5x + 2)$

Problema 5 Resolver y simplificar:

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

Solución:

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

Problema 6

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

Solución:

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

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

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