



EQUATIONS AND FUNCTIONS

3º ESO



Exercise 1: (1.75 ptos) Find the domain of the following functions:

$$\text{a) } f(x) = \frac{x^2 - 9}{x^2 - 5x - 6}$$
$$\text{Dom } f = \mathbb{R} - \{-1, 6\}$$

$$\text{b) } f(x) = \sqrt{x-9}$$
$$\text{Dom } f = [9, +\infty)$$

$$\text{c) } f(x) = \frac{\sqrt[3]{2x+3}}{\sqrt[4]{x+2}}$$
$$\text{Dom } f = (-2, +\infty)$$

Exercise 2: (3.5 ptos)

a) Find the equation of the straight line with a slope $m = -2$ that goes through the point $Q(4, -1)$

$$y = -2x + 7$$

b) Find the **general** equation of a straight line that goes through the points $A(-4, 2)$ and $B(5, 4)$

$$2x - 9y + 26 = 0$$

c) Given the straight line $7x + 2y - 1 = 0$ find the values of the slope and the y-intercept

$$\begin{cases} m = -7/2 \\ n = 1/2 \end{cases}$$

d) Find a straight line that's parallel to $4x - 7y - 1 = 0$ and goes through the point $P(5, -1)$

$$4x - 7y - 27 = 0$$

Exercise 3: (3 ptos) Solve and factorize the following polynomials:

$$\text{a) } P(x) = x^4 - 6x^3 + 9x^2 + 4x - 12 \rightarrow \begin{cases} x = -1, x = 2 \text{ double}, x = 3 \\ P(x) = (x+1)(x-2)^2(x-3) \end{cases}$$

$$\text{b) } Q(x) = x^5 - x^4 + 4x^3 - 4x^2 \rightarrow \begin{cases} x = 0 \text{ double}, x = 1 \\ Q(x) = x^2(x-1)(x^2+4) \end{cases}$$

$$\text{c) } R(x) = x^4 + 6x^3 + 13x^2 + 12x + 4 \rightarrow \begin{cases} x = -1 \text{ double}, x = -2 \text{ double} \\ R(x) = (x+1)^2(x+2)^2 \end{cases}$$



Exercise 4: (1.75 pts) Given the graph of a certain function:



- a) Indicate its domain and its image
- b) Indicate the points where the function crosses the axes
- c) Study its monotony
- d) Study the extrema

a) $\text{Dom } f = (-4, 0] \cup [1, +\infty)$

$\text{Im } f = [-5, +\infty)$

b) $\underline{OX}$ $x = -3, x = 5$ $\underline{OY}$ $y = -3.5$

c) Increases: $(1, 3)$ and $(4, +\infty)$

Decreases: $(-4, 0)$ and $(3, 4)$

d) Relative maxima: $x = 3$

Absolute maximum: $\nexists$

Relative minima: $x = 0, x = 1, x = 4$

Absolute minimum: $x = 1$

