

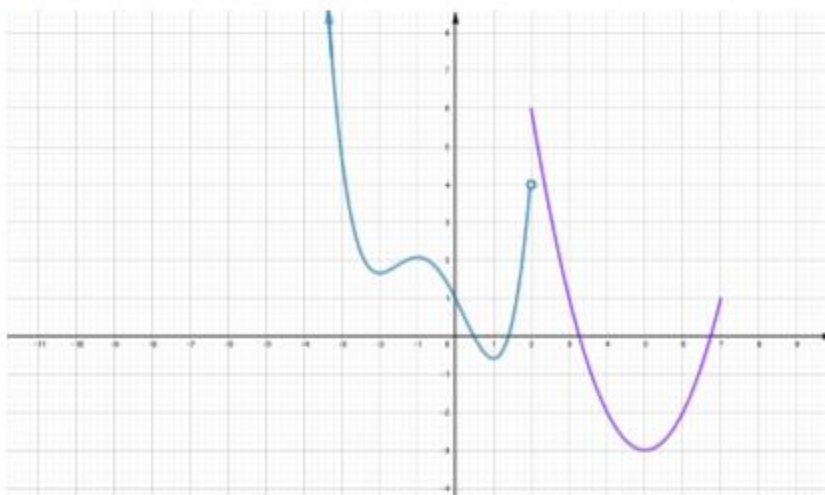


THIRD TERM GLOBAL TEST

3º ESO



Exercise 1: (2 points) Given the following graph of a certain function:



a) Indicate its domain and its image

$$\text{Dom } f = (-\infty, 7] \quad \text{Im } f = [-3, +\infty)$$

b) Study its monotony

Increases: $(-2, -1)$ and $(1, 2)$ and $(5, 7)$

Decreases: $(-\infty, -2)$ and $(-1, 1)$ and $(2, 5)$

c) Study the relative and absolute extrema

Relative maxima: $x = -1, x = 2, x = 7$ Absolute maximum: \nexists

Relative minima: $x = -2, x = 1, x = 5$ Absolute minimum: $x = 5$

Exercise 2: (1.5 points) Find the domain of the following functions:

a) $f(x) = \frac{5x-1}{x^3-5x^2-6x} \rightarrow \text{Dom } f = \mathbb{R} - \{-1, 0, 6\}$ (1)

b) $f(x) = \frac{1+x^2}{\sqrt{x+3}} \rightarrow \text{Dom } f = (-3, +\infty)$ (0.5)

Exercise 3: (2 points)

a) Find the **general** equation of the line that goes through the points $P(-2, 7)$ and $Q(5, 4)$ (1.25)
 $3x + 7y - 43 = 0$

b) Find a parallel line to $7x - 3y - 2 = 0$ going through the point $A(-1, 5)$. Indicate also its (0.75)
slope and y-intercept (of the parallel line). $\rightarrow 7x - 3y + 22 = 0 \rightarrow \begin{cases} m = 7/3 \\ n = 22/3 \end{cases}$



Exercise 4: (2.5 points) Factorize the following polynomials and indicate their roots:

$$\text{a) } P(x) = x^4 - x^3 - 8x^2 + 12x \rightarrow \begin{cases} \text{Roots: } x = 0, x = -3, x = 2 \text{ double} \\ \text{Factorization: } x(x+3)(x-2)^2 \end{cases} \quad (1)$$

$$\text{b) } P(x) = x^3 - 5x^2 + x - 5 \rightarrow \begin{cases} \text{Roots: } x = 5 \\ \text{Factorization: } (x-5)(x^2+1) \end{cases} \quad (0.75)$$

$$\text{c) } R(x) = x^4 - 13x^2 + 36 \rightarrow \begin{cases} \text{Roots: } x = \pm 2, x = \pm 3 \\ \text{Factorization: } (x+2)(x-2)(x+3)(x-3) \end{cases} \quad (0.75)$$

Exercise 5: (2 points) Plot graph of the function $f(x) = \begin{cases} 5 & x < -2 \\ x^2 - 2x - 3 & -2 \leq x < 2 \\ x - 1 & 2 < x \leq 8 \end{cases}$

