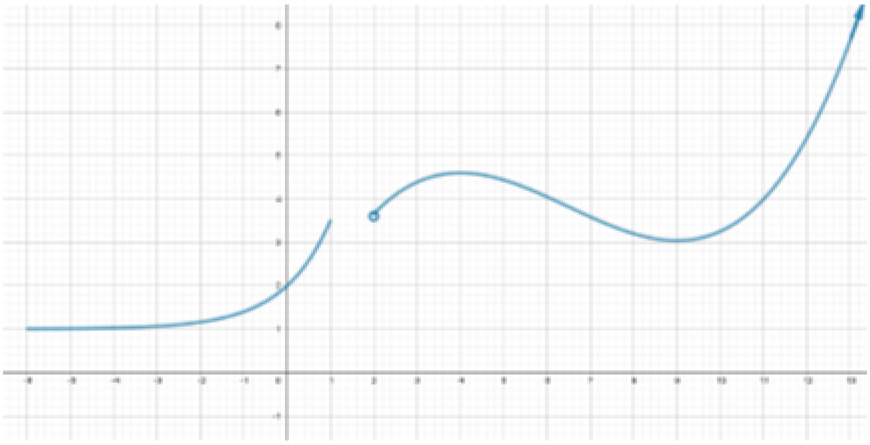
FUNCTIONS TEST – 4° ESO

Exercise 1: (1.5 ptos) Given the following graph of a certain function (the distance between consecutive marks in the axes is one):



a) Indicate the domain and the image $\text{Dom } f = [-6,1] \cup (2,+\infty)$ $\text{Im } f = [1,+\infty)$

b) Study the monotony $\text{Increases: } (-6,1) \cup (2,4) \cup (9,+\infty)$ $\text{Decreases: } (4,9)$

c) Indicate the relative and absolute extrema

$\text{Relative maxima: } x = 1,\ x = 4$ $\text{Absolute maximum: } \nexists$

$\text{Relativa minima: } x = -6,\ x = 9$ $\text{Absolute minimum: } x = -6$

Exercise 2: (2.75 ptos) Find the domain of the following functions:

a) $f(x) = \dfrac{5-3x}{x^2-2x-3} \rightarrow \text{Dom } f = \mathbb{R} - \{-1,3\}$ (0.5)

b) $f(x) = \sqrt{x^2-8x-9} \rightarrow \text{Dom } f = (-\infty,-1] \cup [9,+\infty)$ (0.75)

c) $f(x) = \dfrac{x^2-2x+1}{\sqrt{9-x^2}} \rightarrow \text{Dom } f = (-3,3)$ (0.75)

d) $f(x) = \dfrac{\sqrt{x-1}}{x^2-3x} \rightarrow \text{Dom } f = [1,3) \cup (3,+\infty)$ (0.75)

Exercise 3: (2.5 ptos) Work out:

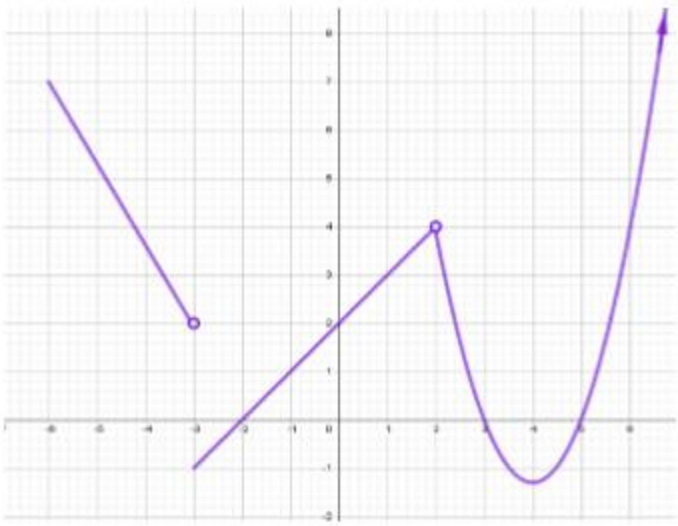
a) $\lim\limits_{x\to 4} \dfrac{x^2-16}{x^2-6x+8} = 4$ (0.5)

b) $\lim\limits_{x\to +\infty} \dfrac{x^2-4x+3}{x^3+3x^2-x} = 0$ (0.25)

c) $\lim\limits_{x\to +\infty} \left(2x - \dfrac{2x^2-4x+1}{x-3}\right) = -2$ (1)

d) $\lim\limits_{x\to 3} \dfrac{1-x}{x-3} = \nexists$ (0.75)

Exercise 4: (1 pto) Find the following limits:



$\lim_{x\to -3^-} f(x) = 2$

$\lim_{x\to -3^+} f(x) = -1$

$\lim_{x\to -3} f(x) = \nexists$

$\lim_{x\to 2} f(x) = 4$

$f(2) = \nexists$

$\lim_{x\to +\infty} f(x) = +\infty$

Exercise 5: (2.25 ptos) Find the asymptotes of the following functions:

a) $f(x) = \dfrac{7x^2+4x+3}{x^2-1} \rightarrow \begin{cases} HA & y=7 \\ VA & x=\pm 1 \end{cases}$

b) $f(x) = \dfrac{4x-1}{3x-5} \rightarrow \begin{cases} HA & y=4/3 \\ VA & x=5/3 \end{cases}$

c) $\begin{cases} HA & y=2 \\ VA & x=-3, \quad x=1 \end{cases}$