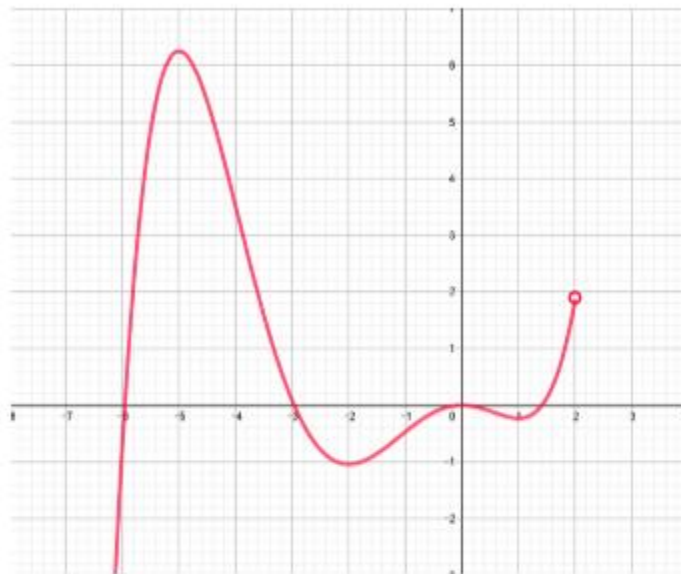# FUNCTIONS – 4º ESO

Exercise 1: (1.25 points) Given the graph of the following function

a) Study the domain and the image of the function
b) Study its monotony
c) Indicate the relative and absolute extrema

Exercise 2: (0.5 points) Work out the equation of the straight line that passes through the points $P(5,-2)$ and $Q(7,4)$

Exercise 3: (1.5 points) Calculate the value of the following logarithms

a) $\log_2 0.0625 =$

b) $\log_7 343 =$

c) $\dfrac{\log_5 9}{\log_5 81} =$

d) $\dfrac{\log 20 + \log 50}{\log 80 - \log 8} =$

Exercise 4: (1.5 points) Find the domain of the functions:

a) $f(x) = \sqrt{x^2 + 4x + 3}$

b) $g(x) = \dfrac{\sqrt[3]{x^2 - 16}}{x^2 - 9}$

c) $h(x) = \dfrac{\sqrt{x+2}}{x^2 - 6x + 9}$

Exercise 5: (1.5 points) Work out the value of these limits

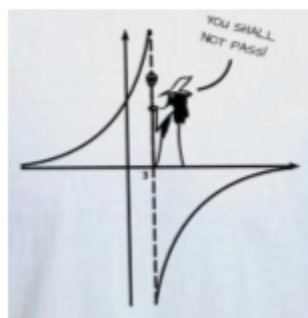a) $\displaystyle \lim_{x \to 1} \frac{x^2 - 3}{x^2 + x - 2} =$

b) $\displaystyle \lim_{x \to 3} \frac{x^2 + 2x - 15}{x^2 - 9} =$

c) $\displaystyle \lim_{x \to +\infty} \left(x - \frac{x^2 + 3}{x - 1} \right) =$

Exercise 6: (0.75 points) Find the asymptotes of the following functions:

a) $f(x) = \dfrac{5x^2 - 3x}{x^2 - 1}$

b)

Exercise 7: (1 point) Plot the graph of the parabola $f(x) = x^2 + 4x + 3$, finding the points where it crosses the axes and the coordinates of the vertex.

Exercise 8: (2 points) Sketch the graph the piecewise function given below:

$$f(x) = \begin{cases} x+3 & x < -1 \\ 2^x & -1 \le x < 3 \\ \dfrac{8}{x-2} & 3 \le x < 10 \end{cases}$$

With a different color or a dotted line, and over the same set of axes, draw the graph of $|f(x)|$