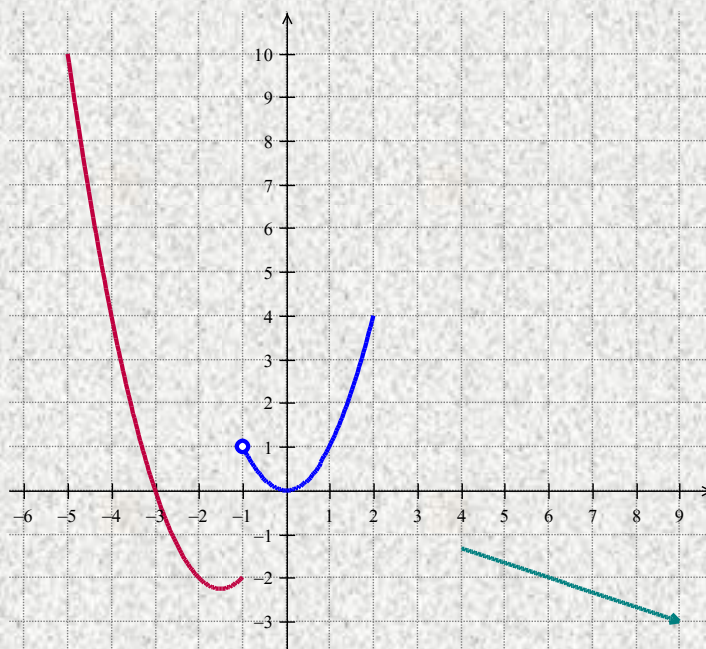


## FUNCTIONS TEST – 3<sup>rd</sup> ESO

**Exercise 1: (1 point)** Work out the domain of the following functions:

a)  $f(x) = x^2 - 9$       b)  $f(x) = \frac{x^4 - 5x^3 + 7x^2 - 8x + 10}{x + 17}$       c)  $f(x) = \frac{17}{x^2 - 8x + 7}$

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



- Indicate its domain and its image. Is it a continuous function? Why?
- Determine the points where the function crosses the axes
- Study its monotony
- Study the local and global extrema

**Exercise 3: (1 point)** Plot the graph of a function that fulfills all the following characteristics at the same time:

- Its domain is  $[-8, -2] \cup (2, +\infty)$
- It crosses the axes at the points  $(-5, 0)$ ,  $(0, 7)$  and  $(3, 0)$
- It has minima at  $x = -6$  and  $x = 5$  and a maximum at  $x = -3$ , either local or global

**Exercise 4: (2.25 points)**

- Work out the equation of the straight line that passes through the points  $P(-2, 5)$  and  $Q(2, 17)$
- Work out the general equation of the straight line that passes through the point  $P(-7, 0)$  with a slope  $m = -5$
- Work out the equation of the straight line that is parallel to  $x - 2y + 12 = 0$  and passes through the point  $A(-1, 4)$ . What's the value of the slope?

**Exercise 5: (1.75 points)** Plot the graph of the function  $f(x) = -x^2 + 8x - 12$ , indicating its direction, studying the points where it crosses the axes and finding the coordinates of the vertex. Construct also a table with a couple of values.

**Exercise 6: (2 points)** Plot the graph of the piecewise function given below

$$f(x) = \begin{cases} 1-2x & x \leq -2 \\ x^2 - 1 & -2 < x < 3 \\ 8 & 3 < x \leq 9 \end{cases}$$