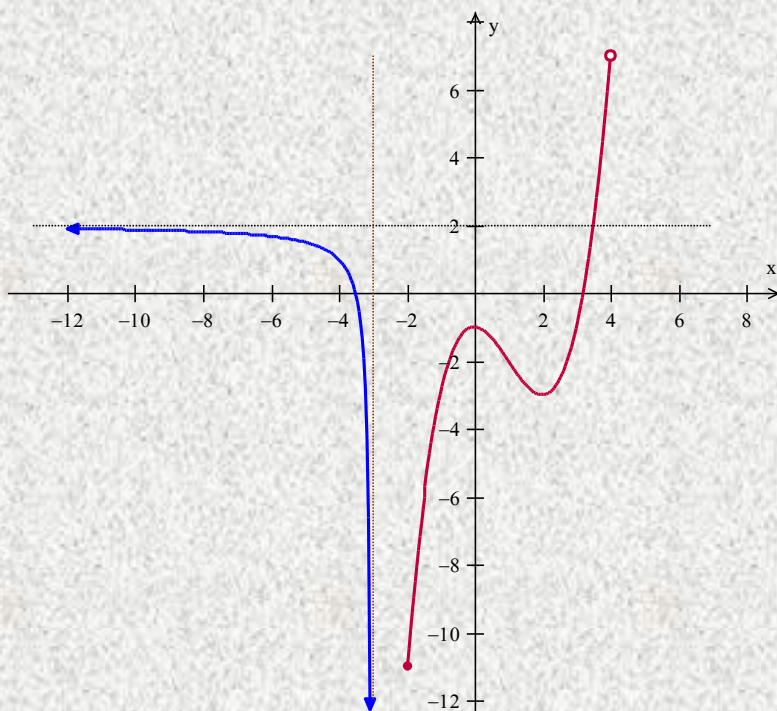


FUNCTIONS, LIMITS AND CONTINUITY - 4th COURSE OF ESO - B

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



- Study its domain and the image of the function
- Determine the points where the function crosses the axes
- Study its monotony and local and global extrema
- Indicate the equations of the asymptotes

Exercise 2: (1 point) Work out the equation of the straight line that passes through the points A(-3, 2) and B(3, 4)

Exercise 3: (1 point) Calculate the value of the following logarithms

- | | |
|---------------------|-----------------|
| a) $\log 0.00001 =$ | b) $\log_7 1 =$ |
| c) $\log_2 1024 =$ | d) $\ln e =$ |

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

- $f(x) = x^5 - 3x^4 + 7x^3 - 8x + 24$
- $f(x) = \sqrt{x^2 + 7x + 6}$
- $f(x) = \frac{\sqrt[3]{x^2 - 1}}{x^2 - 25}$
- $f(x) = \frac{\sqrt{x^2 - 4}}{x^2 - x - 6}$

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

a) $\lim_{x \rightarrow 3} \frac{x^2 + 2x - 15}{x^3 - 4x^2 - 3x + 18} =$

b) $\lim_{x \rightarrow -\infty} \frac{5x^2 + 7x - 9}{x + 3} =$

c) $\lim_{x \rightarrow -2} \frac{2x + 3}{x^2 + 4x + 4} =$

d) $\lim_{n \rightarrow \infty} (\sqrt{n^2 + 5} - \sqrt{n^2 - 3n}) =$

Exercise 6: (3 points) Study the continuity of the piecewise function given below and plot its graphic

$$f(x) = \begin{cases} 15 + 3x & x < -2 \\ \left(\frac{1}{3}\right)^x & -2 \leq x < 1 \\ x^2 - 4x + 3 & 1 \leq x < 4 \\ 3 & 4 < x \leq 7 \end{cases}$$

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