

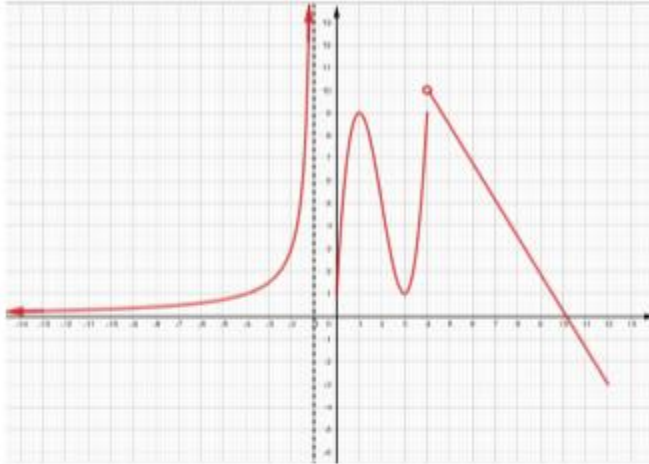


FUNCTIONS AND LIMITS

4' ESO



Exercise 1: (1.5 points) Given the graph of the following function



a) Indicate the domain and the image

$$\text{Dom } f = (-\infty, -1) \cup [0, 12] \quad \text{Im } f = [-3, +\infty)$$

b) Study its monotony

Increases: $(-\infty, -1)$ and $(0, 1)$ and $(3, 4)$

Decreases: $(1, 3)$ and $(4, 12)$

c) Study the extrema

Rel. max: $x = 1, x = 4$, Abs. max: $\cancel{\exists}$

Rel. min: $x = 0, x = 3, x = 12$, Abs. min: $x = 12$

Exercise 2: (1 point) Work out the general equation of the straight line that passes through the points $A(5, -2)$ and $B(7, 1) \rightarrow 3x - 2y - 19 = 0$

Exercise 3: (1.5 points) Find the domain of the functions:

a) $f(x) = \frac{\sqrt{x-2}}{x^2-9} \rightarrow \text{Dom } f = [2, 3) \cup (3, +\infty)$ (0.75)

b) $f(x) = \frac{2x+3}{\sqrt[10]{x^2-1}} \rightarrow \text{Dom } f = (-\infty, -1) \cup (1, +\infty)$ (0.75)

Exercise 4: (2.25 points) Work out the value of these limits:

a) $\lim_{x \rightarrow \infty} \left(x - \frac{x^2 - 3x + 1}{x - 2} \right) = 1$ (1)

b) $\lim_{x \rightarrow -5} \frac{x-6}{x+5} = \cancel{\exists}$ (0.75)

$\lim_{x \rightarrow 2} \frac{x^2 + 6x - 16}{x^2 - 4} = \frac{5}{2}$ (0.5)

Turn the page around.



Exercise 5: (1.5 points) Find the asymptotes of the following functions:

$$\text{a) } f(x) = \frac{x+3}{2x-7} \rightarrow \begin{cases} \text{HA} & y = 1/2 \\ \text{VA} & x = 7/2 \end{cases}$$

$$\text{b) } f(x) = \frac{x+9}{x^2-25} \rightarrow \begin{cases} \text{HA} & y = 0 \\ \text{VA} & x = \pm 5 \end{cases}$$

Exercise 6: (2.25 points) Plot the piecewise function:

$$f(x) = \begin{cases} 5 & x < -1 \\ x^2 - 4x & -1 \leq x < 3 \\ 2x - 7 & 3 \leq x < 7 \end{cases}$$

