FUNCTIONS TEST – 4° ESO

Exercise 1: (2.75 ptos) Find the domain of the following functions:

a) $f(x)=\dfrac{7x+4}{x^2-25} \rightarrow$ $\text{Dom } f=\mathbb{R}-\{\pm 5\}$ (0.5)

b) $f(x)=\sqrt[4]{9-x^2} \rightarrow \quad \rightarrow$ $\text{Dom } f=[-3,3]$ (0.75)

c) $f(x)=\dfrac{\sqrt{x+3}}{x^2-16} \rightarrow$ $\text{Dom } f=[-3,4)\cup(4,+\infty)$ (0.75)

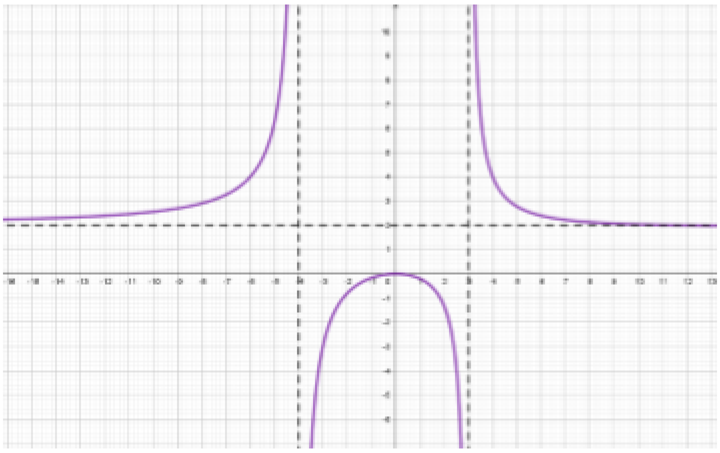
d) $f(x)=\dfrac{x^2-49}{\sqrt{x^2-4x+3}} \rightarrow$ $\text{Dom } f=(-\infty,1)\cup(3,+\infty)$ (0.75)

Exercise 2: (2.25 ptos) Find the asymptotes of the following functions:

a) $f(x)=\dfrac{3x^2+4x}{x^2-6x-7} \rightarrow$ $\begin{cases} HA & y=3 \\ VA & x=-1 \quad x=7 \end{cases}$

b) $f(x)=\dfrac{7}{5x-2} \rightarrow$ $\begin{cases} HA & y=0 \\ VA & x=2/5 \end{cases}$

c)



$\begin{cases} HA & y=2 \\ VA & x=-4 \quad x=3 \end{cases}$

Exercise 3: (3 ptos) Work out:

a) $\lim\limits_{x\to 3}\dfrac{x^2-9}{x^2+2x-15}=\dfrac{3}{4}$ (0.5)

b) $\lim\limits_{x\to +\infty}\dfrac{5x-8}{x^2-25}=0$ (0.25)

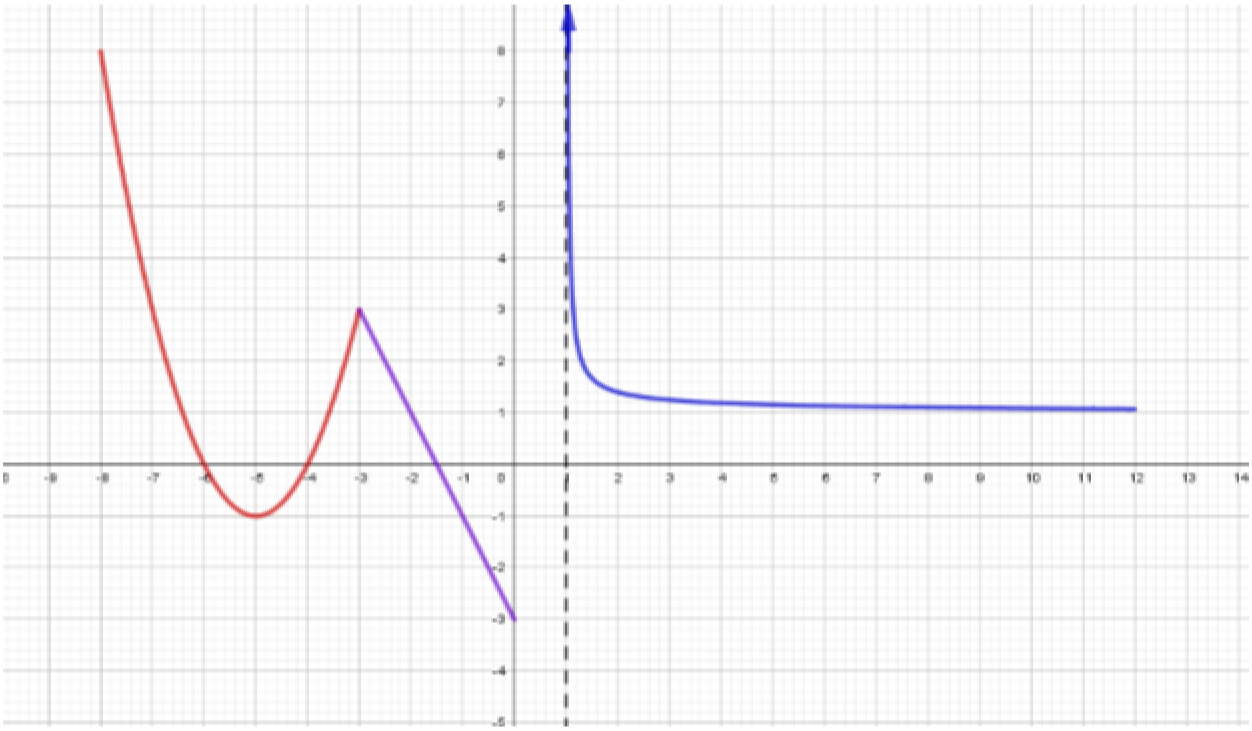
c) $\lim\limits_{x\to +\infty}\left(3x-\dfrac{3x^2-7x}{x+2}\right)=13$ (0.75)

d) $\lim_{x\to -2} \frac{7x}{x+2} = \nexists$ (0.75)

e) $\lim_{x\to +\infty} \frac{7x-4}{3x-2} = \frac{7}{3}$ (0.25)

f) $\lim_{x\to 1} \frac{x-3}{x^2-2x+1} = -\infty$ (0.5)

Exercise 4: (2 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

$\text{Dom} f = [-8,0] \cup (1,12]$ $\text{Im} f = [-3,+\infty)$

b) Indicate the points where the function crosses the axes

$\underline{OX}|$ $x=-6$ $x=-4$ $x=-1.5$ $\underline{OY}|$ $y=-3$

c) Study the monotony

Increases: $(-5,-3)$

Decreases: $(-8,-5) \cup (-3,0) \cup (1,12)$

d) Indicate the relative and absolute extrema

Relative minima: $x=-5$, $x=0$, $x=12$ Absolute minimum: $x=0$

Relative maxima: $x=-8$, $x=-3$ Absolute maximum: $\nexists$