UNIT 10: CHARACTERISTICS OF FUNCTIONS

Exercise 1: Find the domain of the following functions:

a) $f(x)=\dfrac{x^7-3x^5+2x^3-8x+1}{x-2}$

b) $f(x)=\dfrac{7}{5x+6}$

c) $f(x)=\dfrac{8x-4}{x^2+1}$

d) $f(x)=\dfrac{5x+2}{x^2-9}$

e) $f(x)=\dfrac{x^2-9}{x^2-7x+6}$

f) $f(x)=\sqrt{x+7}$

g) $f(x)=\sqrt[3]{x^2-5x+6}$

h) $f(x)=\sqrt[4]{x-5}$

Exercise 2: Find the domain of the following functions:

a) $f(x)=\dfrac{3x^2-7}{x+3}$

b) $f(x)=\dfrac{x+1}{x^2-4}$

c) $f(x)=\dfrac{x^2-5x+6}{x^3-3x^2+3x-1}$

d) $f(x)=\sqrt{x-3}$

e) $f(x)=\sqrt{9-x}$

f) $f(x)=\dfrac{7x+2}{2x-9}$

g) $f(x)=\sqrt[3]{\dfrac{x+8}{x^2-16}}$

h) $f(x)=\dfrac{5x}{x^2+25}$

i) $f(x)=\dfrac{x^2-6x+9}{\sqrt{x-1}}$

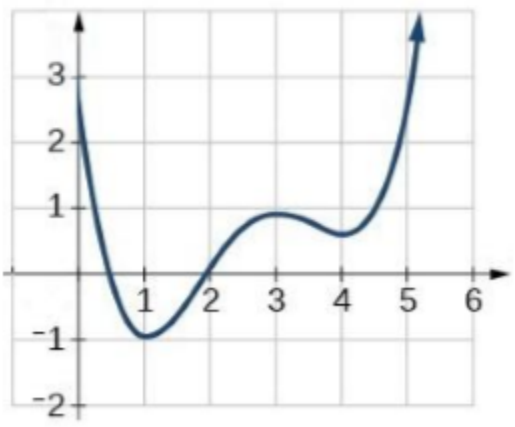
j) $f(x)=\dfrac{x+10}{\sqrt[3]{x-1}}$

k) $f(x)=\dfrac{5x-7}{\sqrt{x^2+1}}$

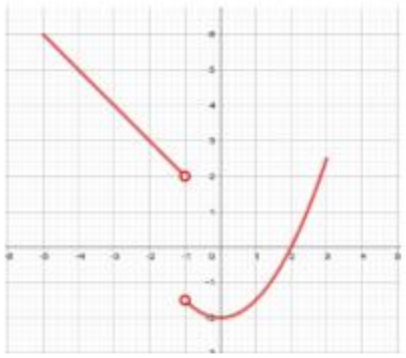
Exercise 3: Find the domain and the range of the following functions and indicate the points where they cross the axes:

a)

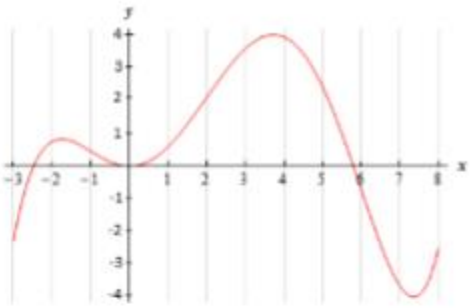
b)



c)

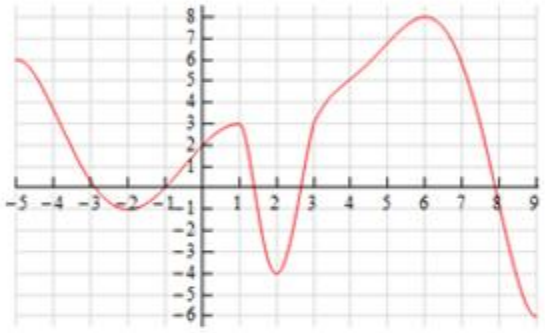


d)

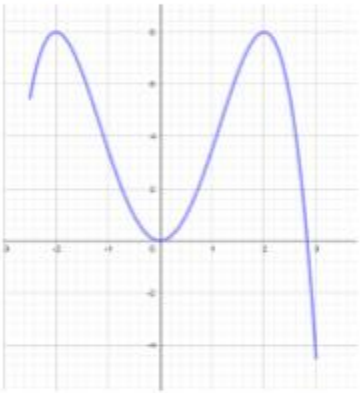


Exercise 4: Study the monotony and the extrema of the following functions:

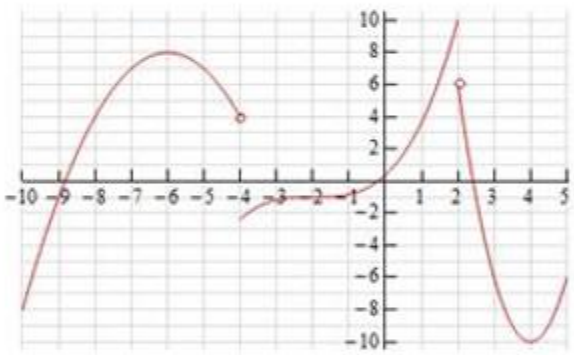
a)



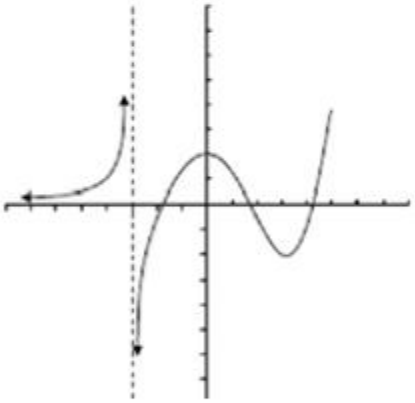
b)



c)



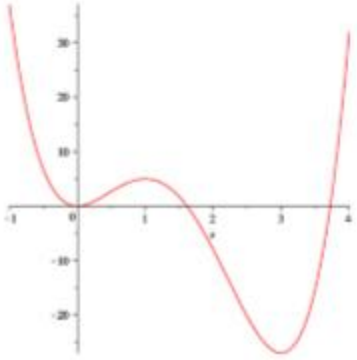
d)



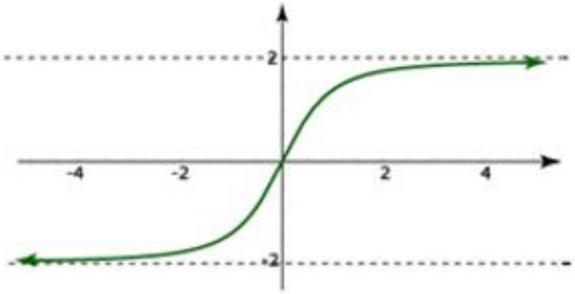
Exercise 5: Given the following graphs:

a) Study the domain and the range
b) Find the points where the function crosses the axes
c) Study the monotony
d) Find the local and global extrema

a)



b)



Exercise 6: Given the following graphs:

a) Study the domain and the range

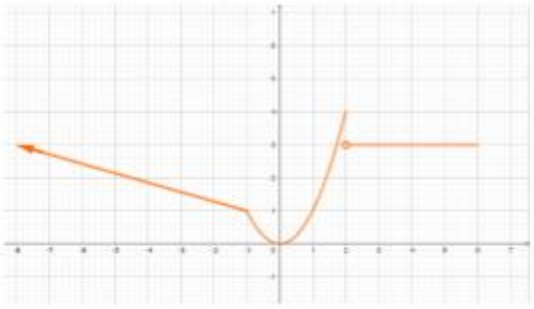
b) Find the points where the function crosses the axes

c) Study the monotony

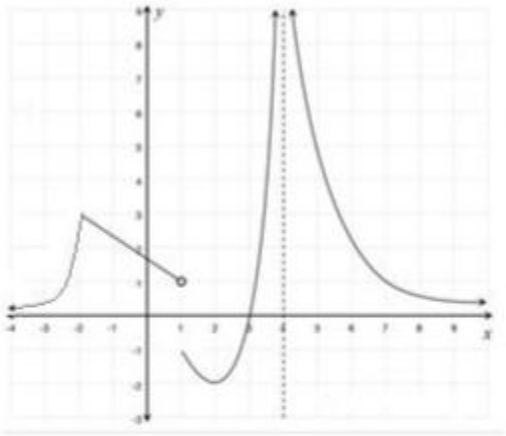
d) Find the local and global extrema

e) Find $f(1)$

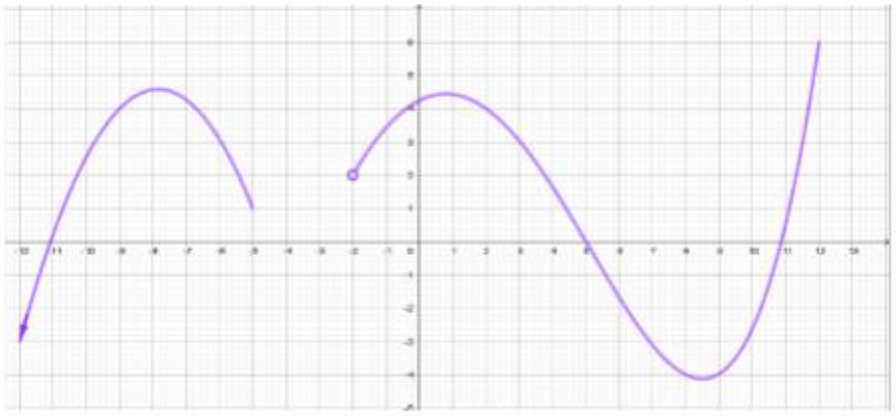
a)



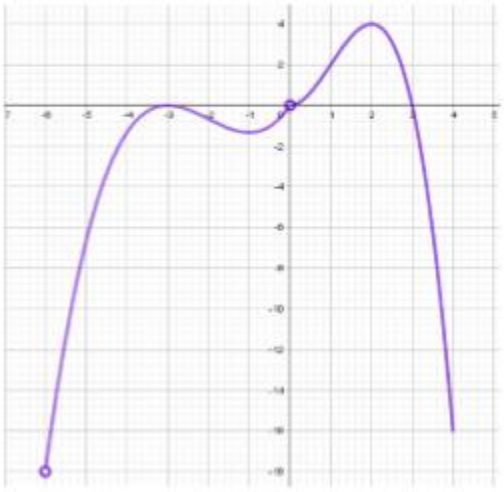
b)



c)



d)



e)

Exercise 7: Work out the graph of a function that fulfills all the following characteristics at the same time:

a) Its domain is $(-7,-1]\cup[2,+\infty)$

b) It crosses the axes at the points (-5,0) and (3,0)

c) It has a minimum at $x=-3$ and a maximum at $x=7$, either local or global

Exercise 8: Plot the graph of a function that fulfills all the following characteristics at the same time:

a) Its domain is $(-\infty,2]\cup[4,9)$

b) It crosses the axes at the points (-2,0) and (0,5)

c) It has minima at x = -5 and x = 3 and a maximum at x = -7, either local or global

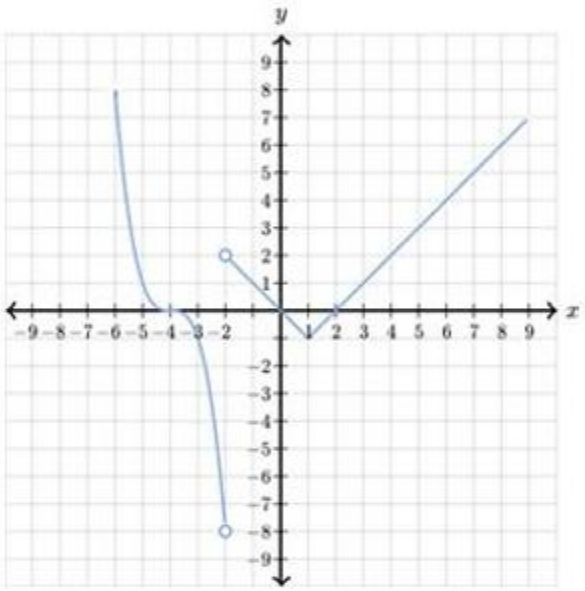
Exercise 9: Plot the graph of a function that fulfills all the following characteristics at the same time:

a) Its domain is $(-12,10]$

b) It crosses the axes at the points (-10,0), (7,0), (0,-3) and (0,8)

c) It has a minimum at x = - 4 and maxima at x = - 7 and x = 2, either local or global

Exercise 10: Given the following graph of a certain function:



a) Indicate its domain and its image

b) Determine the points where the function crosses the axes

c) Study its monotony

d) Study the local and global extrema

e) Find $f(1)$, $f(0)$, $f(9)$, $f(-2)$