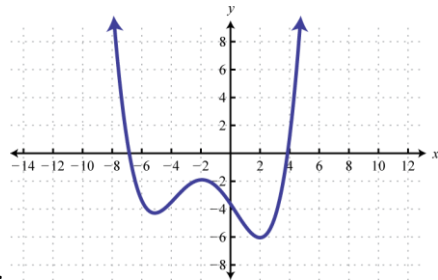
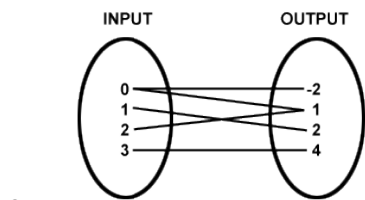


Instructions: Show work on a separate sheet of paper and attach to this page. You may check your work with technology not available in class, but you should be able to solve problems and show work without such technology.

1. For each of the relations below, determine which are functions.

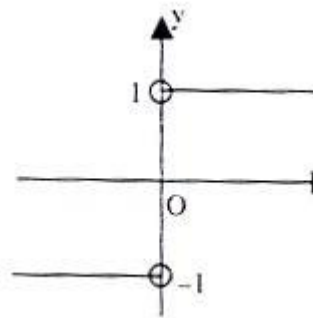


a.

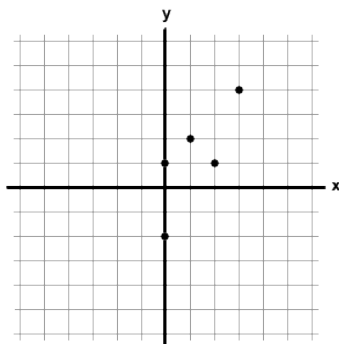
$$x = |y| + 1$$

x	y
4	-3
3	-2
2	-1
1	0
2	1
3	2
4	3

b.



e.



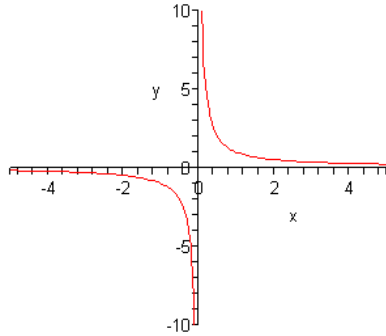
c.

f. $\{(1,3), (3,3), (4,3), (8,3), (22,3)\}$

2. Graph the function $f(x) = |x| + 1$. State the domain and range.

3. For each of the functions below, determine the following:

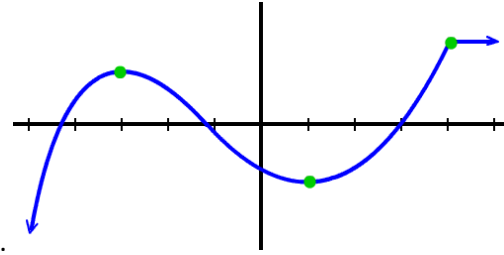
- i. The domain and range
- ii. The symmetry of the function
- iii. The interval(s) where the function is increasing, decreasing, or constant.
- iv. The location and value of any relative extrema (maxima or minima).



a.

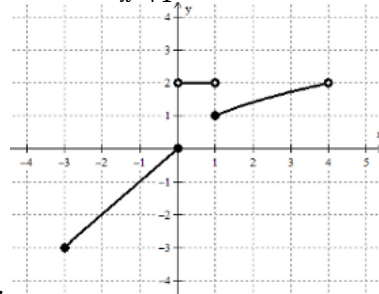
b. $f(x) = x\sqrt{1-x^2}$

c. $f(x) = \begin{cases} x+3, & x \leq -3 \\ -(x+3), & x > -3 \end{cases}$



d.

e. $f(x) = \frac{|x^2-4|}{x^4+1}$



f.

4. Graph the following piecewise functions. You can use a program like Graph Free at <http://www.graphfree.com/> to verify the graphs.

a. $f(x) = \begin{cases} \sqrt{x-4}, & x \geq 4 \\ 4-x, & x < 4 \end{cases}$

b. $f(x) = \begin{cases} -\frac{1}{2}x^2, & x < 1 \\ 2x+1, & x \geq 1 \end{cases}$

c. $f(x) = \begin{cases} -1, & x < -2 \\ x, & -2 \leq x < 1 \\ x^2, & x \geq 1 \end{cases}$

5. Find the equation of the line with the following properties.

a. Passes through the points $(-2, -4), (1, -1)$

b. Has a slope of $-\frac{3}{5}$ and passes through $(7, -4)$

c. Is parallel to $y = -\frac{2}{3}x + 6$, and passes through $(11, 1)$

d. Is perpendicular to the line $4x - 7y = 14$, and passes through the point $(8, -4)$

6. Find an expression for the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the following:

a. $f(x) = -2x^2 + x - 5$

b. $f(x) = \frac{1}{x+2}$

c. $f(x) = \sqrt{x}$

d. $f(x) = x^3$