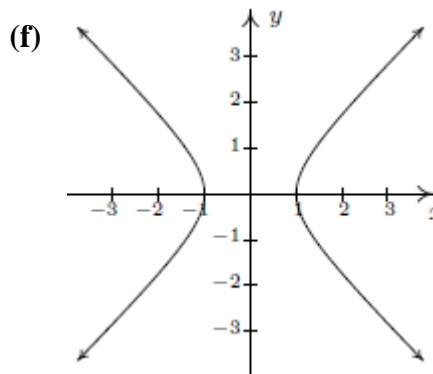
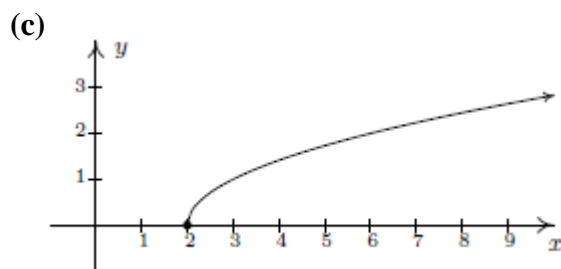
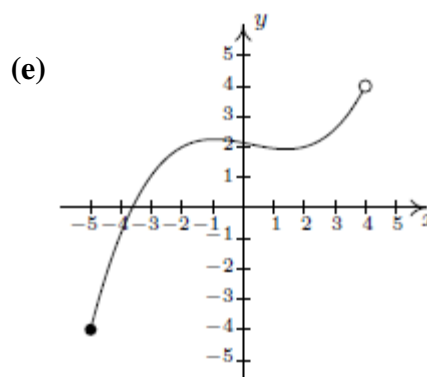
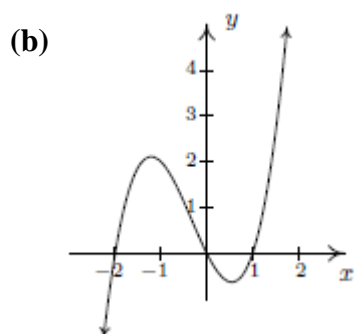
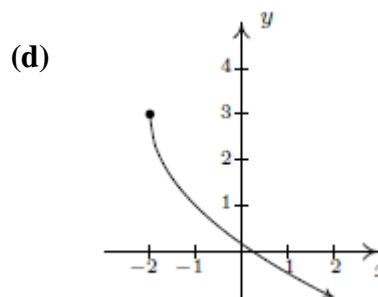
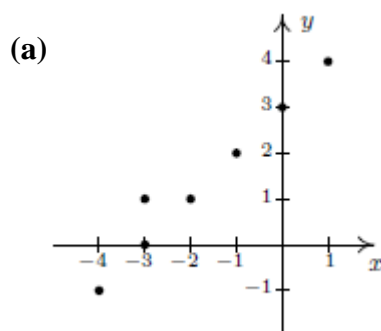


### Worksheet 2 – Graphs of Functions (§3.3)

1. Determine the domain and range of the following relations. Then determine whether or not the relation is a function.



2. Sketch the graph of the following functions.

(a)  $f(x) = \begin{cases} 4 - x, & x \leq 3 \\ 2, & x > 3 \end{cases}$

(b)  $f(x) = \begin{cases} x^2, & x \leq 0 \\ 2x, & x > 0 \end{cases}$

(c)  $f(x) = \begin{cases} -3, & x < 0 \\ 2x - 3, & 0 \leq x \leq 3 \\ 3, & x > 3 \end{cases}$

(d)  $f(x) = \begin{cases} x^2 - 4, & x \leq -2 \\ 4 - x^2, & -2 < x < 2 \\ x^2 - 4, & x \geq 2 \end{cases}$

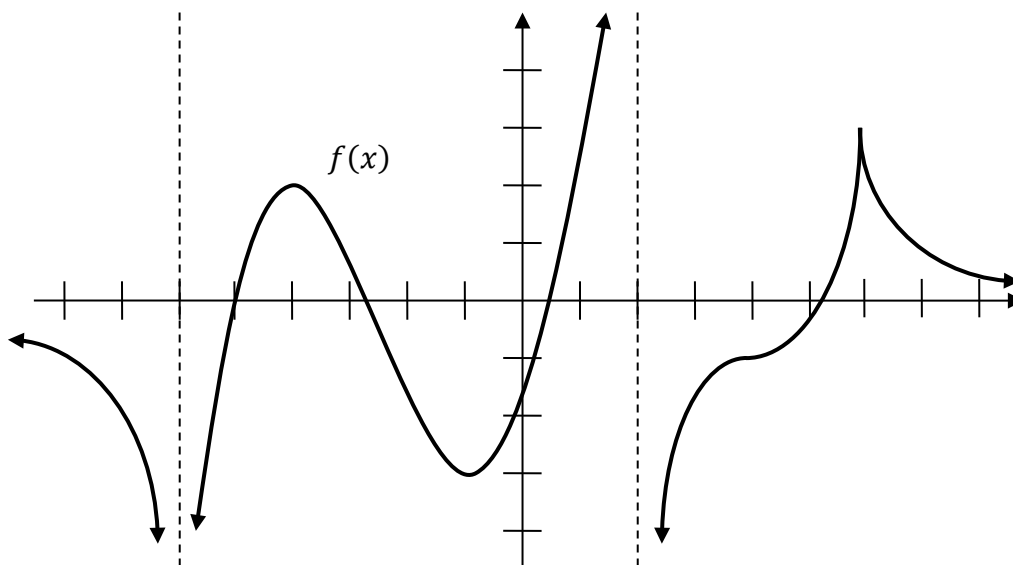
(e)  $f(x) = \begin{cases} -2x - 4, & x < 0 \\ 3x, & x \geq 0 \end{cases}$

(f)  $f(x) = \begin{cases} \sqrt{x+4}, & -4 \leq x < 5 \\ \sqrt{x-1}, & x \geq 5 \end{cases}$

(g)  $f(x) = \begin{cases} x^2, & x \leq -2 \\ 3 - x, & -2 < x < 2 \\ 4, & x \geq 2 \end{cases}$

(h)  $f(x) = \begin{cases} \frac{1}{x}, & -6 < x < -1 \\ x, & -1 < x < 1 \\ \sqrt{x}, & 1 < x < 9 \end{cases}$

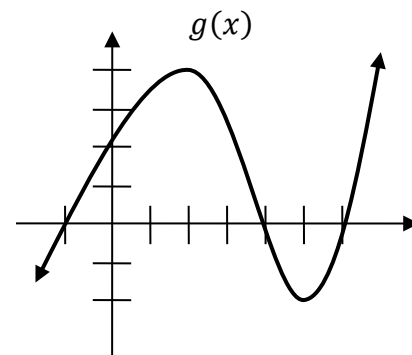
3. Use the graph of  $f(x)$  below for parts (a) through (k).



- Determine the domain of  $f(x)$ .
- Determine the range of  $f(x)$ .
- Determine the intervals where  $f(x)$  is increasing.
- Determine the intervals where  $f(x)$  is decreasing.
- Determine coordinates of all local maxes of  $f(x)$ .
- Determine coordinates of all local mins of  $f(x)$ .
- Determine  $f(-5)$ .
- Determine  $f(-1)$ .
- Is  $f(2.5)$  positive, negative, or zero?
- Is  $f(-3.5)$  positive, negative, or zero?
- Is  $f(10)$  positive, negative, or zero?

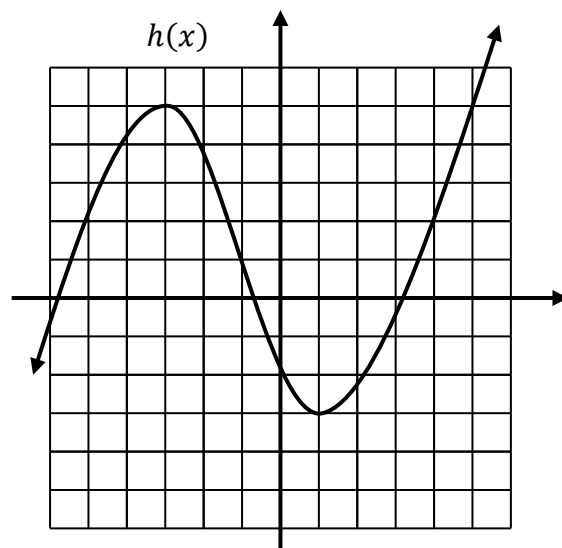
4. Use the graph of  $g(x)$  at the right for parts (a) through (l).

- Determine the domain of  $g(x)$ .
- Determine the range of  $g(x)$ .
- Determine the intervals where  $g(x)$  is increasing.
- Determine the intervals where  $g(x)$  is decreasing.
- Determine coordinates of all local maxes of  $g(x)$ .
- Determine coordinates of all local mins of  $g(x)$ .
- Determine  $g(2)$ .
- Determine  $g(-1)$ .
- Solve  $g(x) = 0$ .
- Is  $g(1)$  positive, negative, or zero?
- Determine the intervals where  $g(x) > 0$ .
- Determine the intervals where  $g(x) \leq 0$ .



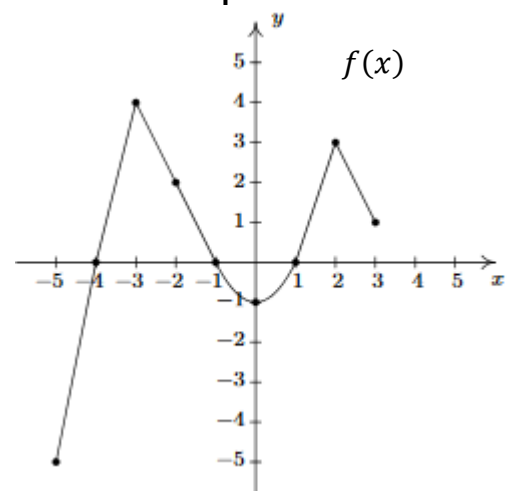
5. Use the graph of  $h(x)$  at the right for parts (a) through (k).

- Determine the domain of  $h(x)$ .
- Determine the range of  $h(x)$ .
- Determine the intervals where  $h(x)$  is increasing.
- Determine the intervals where  $h(x)$  is decreasing.
- Determine coordinates of all local maxes of  $h(x)$ .
- Determine coordinates of all local mins of  $h(x)$ .
- Determine  $h(-1)$ .
- Solve  $h(x) = 5$ .
- Is  $h(2.5)$  positive, negative, or zero?
- Is  $h(0.5)$  positive, negative, or zero?
- Is  $h(4)$  positive, negative, or zero?



6. Use the graph of  $f(x)$  at the right for parts (a) through (l).

- Determine the domain of  $f(x)$ .
- Determine the range of  $f(x)$ .
- Determine the intervals where  $f(x)$  is increasing.
- Determine the intervals where  $f(x)$  is decreasing.
- Determine coordinates of all local maxes of  $f(x)$ .
- Determine coordinates of all local mins of  $f(x)$ .
- Determine  $f(-2)$ .
- Determine  $f(3)$ .
- Solve  $f(x) = 0$ .
- Determine the absolute max and min values.
- Determine the intervals where  $f(x) \geq 0$ .
- Determine the intervals where  $f(x) \leq 0$ .



7. Use the graph of  $g(x)$  at the right for parts (a) through (l).

- Determine the domain of  $g(x)$ .
- Determine the range of  $g(x)$ .
- Determine the intervals where  $g(x)$  is increasing.
- Determine the intervals where  $g(x)$  is decreasing.
- Determine coordinates of all local maxes of  $g(x)$ .
- Determine coordinates of all local mins of  $g(x)$ .
- Determine  $g(2)$ .
- Solve  $g(x) = 0$ .
- Is  $g(-3)$  positive, negative, or zero?
- Determine the absolute max and min values.
- Determine the intervals where  $g(x) \geq 0$ .
- Determine the intervals where  $g(x) \leq 0$ .

