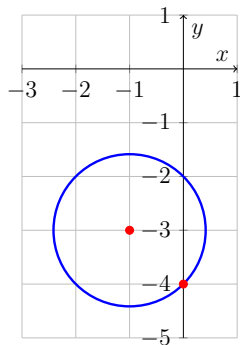


1. Given the points  $(-2, 3)$  and  $(4, 7)$ .
  - (a) Compute the distance between these points.
  - (b) Find the midpoint of the line segment connecting them.
  - (c) Compute the slope of the line connecting the points.
  - (d) Write an equation for the line containing these two points.
  - (e) Find the  $x$ - and  $y$ - intercepts of this line.
  - (f) Find the slope of a line perpendicular to this line.
  - (g) Write an equation for a line perpendicular to this line passing through the point  $(3, 0)$ .

2. Write an equation for the circle graphed here.



3. What is the center and the radius of a circle with equation  $x^2 + y^2 + 8x + 14y + 1 = 0$ ?

4. Find the domain of the function. Write your answer in interval and set builder notation.

(a)  $f(x) = \sqrt{3x - 2}$

(b)  $g(x) = \frac{2x + 1}{x^2 - 9}$

5. For each function compute the given items then determine if the function is even/odd/neither.

(a)  $f(x) = 3x^2 - 2$

i.  $f(0)$

ii.  $f(4)$

iii.  $f(-2)$

iv.  $f(a)$

v.  $f(x + h)$

vi.  $f(t^2 + 1)$

vii.  $x$ -intercepts

viii.  $y$ -intercepts

ix. the average value of  $y = f(x)$  from  $x = 1$   
to  $x = 3$

x. Is  $f$  even/odd/both/neither?

(b)  $g(x) = 2|x - 1| - 4$

i.  $g(0)$

ii.  $g(4)$

iii.  $g(-2)$

iv.  $g(a)$

v.  $g(x + h)$

vi.  $g(r^2 + 1)$

vii.  $x$ -intercepts

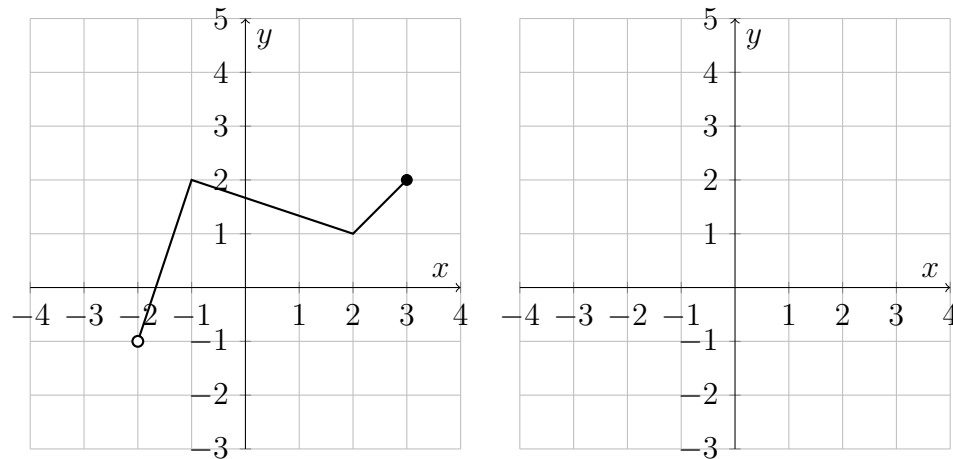
viii.  $y$ -intercepts

ix. the average value of  $y = g(x)$  from  $x = 1$   
to  $x = 3$

x. Is  $g$  even/odd/both/neither?

6. Is the relation  $\{(2, 3), (-1, 3), (5, 3)\}$  a function? What is the domain of the relation? What is the range of the relation?
7. If  $H(t)$  describes the height of a tree that is  $t$  years old, then what does the average rate of change of  $H$  from  $t = 1$  to  $t = 5$  represent?
8. A company that makes thing-a-ma-bobs has a start up cost of \$16936. It costs the company \$1.54 to make each thing-a-ma-bob and the company charges \$4.27 for each thing-a-ma-bob. Let  $x$  represent the number of thing-a-ma-bobs made.
- (a) Write a cost function for this company.
  - (b) Write the revenue function for this company.
  - (c) Write the profit function for this company.
  - (d) What is the minimum number of thing-a-ma-bobs that the company must produce and sell to make a profit?
9. What does the graph of an even function look like? Sketch some examples.
10. What does the graph of an odd function look like? Sketch some examples.

11. Consider the graph of the function  $h(x)$  on the left. The blank grid on the right is for you to possibly use in completing (d)-(f). (Up to you.)



- (a) Explain why the graph defines  $y$  as a function of  $x$ .
- (b) Determine  $h(2)$ .
- (c) Determine  $h(-1)$ .
- (d) Sketch a graph of  $y = h(x - 1)$ .
- (e) Sketch a graph of  $y = 2h(x)$ .
- (f) Sketch a graph of  $y = h(-x)$ .
- (g) What is the domain of  $h(x)$ ?
- (h) What is the range of  $h(x)$ ?
- (i) What are the  $x$ - and  $y$ -intercepts of the graph?
- (j) On what intervals is the function increasing?
- (k) On what intervals is the function decreasing?
- (l) Write  $h(x)$  as a piecewise function by finding equations for each of the three linear portions of the graph.

12. Given the piecewise function, evaluate the values.

$$g(x) = \begin{cases} x + 2 & \text{if } x \leq -5 \\ |x + 1| + 2 & \text{if } -5 < x < 0 \\ \frac{1}{3x+2} & \text{if } 0 \leq x \leq 2 \\ x^2 + x + 1 & \text{if } x > 2 \end{cases}$$

(a)  $f(0)$

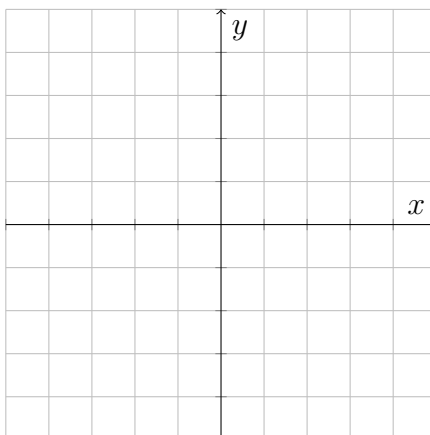
(c)  $f(1)$

(b)  $f(-5)$

(d)  $f(10)$

13. Graph the piecewise function

$$r(x) = \begin{cases} 3x + 2 & \text{if } x \leq 1 \\ -5 & \text{if } x > 1 \end{cases}$$



14. Let  $f(x) = x^2 + 1$ ,  $g(x) = |x - 2|$ ,  $h(x) = 4x - 3$ .

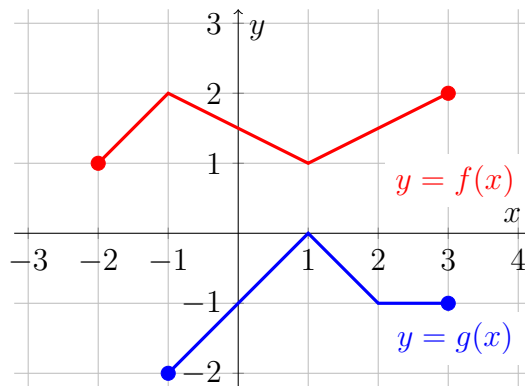
(a) Compute  $g(h(2))$ .

(b) Compute  $f \circ g(-3) = f(g(-3))$ .

(c) Compute and simplify  $f(h(x))$ .

(d) Compute and simplify  $h \circ h(x) = h(h(x))$ .

15. Given the graphs below



(a) Compute  $g(f(-2))$ .

(b) Compute  $f(g(2))$ .

(c) Compute  $f \circ g(0)$ .

(d) Compute  $g \circ f(0)$ .

(e) Compute  $f \circ f(-1)$ .

16. Let  $H(x) = 4(x - 2)^{10}$ . Which of the following pairs of functions  $f(x)$  and  $g(x)$  will produce  $f \circ g(x) = H(x)$ ? (There are two...) Can you find another decomposition?

- $f(x) = 4x - 2$  and  $g(x) = x^{10}$
- $f(x) = x^{10}$  and  $g(x) = 4x - 2$
- $f(x) = 4x^{10}$  and  $g(x) = x - 2$
- $f(x) = x - 2$  and  $g(x) = 4x^{10}$
- $f(x) = 4x$  and  $g(x) = (x - 2)^{10}$
- $f(x) = (x - 2)^{10}$  and  $g(x) = 4x$

17. For each Section in Chapter 2, write down the key terms and ideas.

(a) Section 2.1: The Rectangular Coordinate System

(b) Section 2.2: Circles

(c) Section 2.3: Functions and Relations

(d) Section 2.4: Linear Equations in Two Variables and Linear Functions

(e) Section 2.5: Applications of Linear Equations and Modeling

(f) Section 2.6: Transformations of Graphs

(g) Section 2.7: Analyzing Graphs of Functions and Piecewise Defined Functions

(h) Section 2.8: Algebra of Functions and Function Composition