

Taken from § 2.2 in the text.

1. The formula for a linear function is  $f(x) =$  \_\_\_\_\_
3. The graph of a linear function is a \_\_\_\_\_
5. If  $f(x) = 7x + 5$ , each time  $x$  increases by 1 unit,  $f(x)$  increases by \_\_\_\_\_ units

For exercises 9 - 19 odd, determine whether the described function is linear. For 9 - 15 odd, if it is linear, give values for  $m$  and  $b$  so that the function may be expressed in slope-intercept form [ $f(x) = mx + b$ ]. For 17 and 19 please refer to the figures in the text.

9.  $f(x) = \frac{1}{2}x - 6$

11.  $f(x) = \frac{5}{2} - x^2$

13.  $f(x) = -9$

15.  $f(x) = -9x$

17.

19.

For exercises 21 - 27 odd, use the table to determine whether  $f(x)$  could represent a linear function. If it could, write  $f(x)$  in the form  $f(x) = mx + b$ .

21. 

$x$	0	1	2	3
$f(x)$	-6	-3	0	3

23. 

$x$	-2	0	2	4
$f(x)$	6	3	0	-3

25. 

$x$	-2	-1	0	1
$f(x)$	-5	0	20	40

27. 

$x$	1	2	3	4
$f(x)$	0	2	4	6

In exercises 35 - 39 odd, use the graph of  $f$  shown in the text to evaluate the function at the given values of  $x$ .

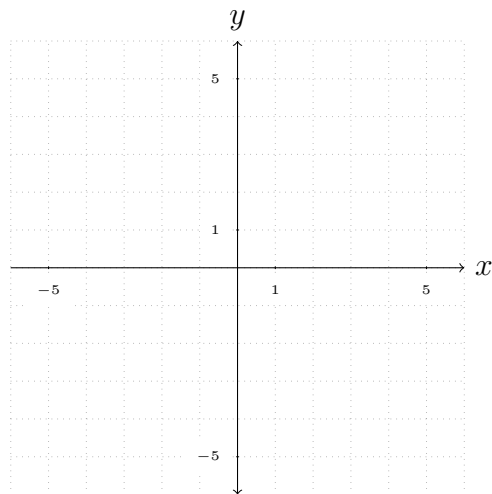
35.  $f(-1)$   $f(0)$

37.  $f(-2)$   $f(4)$

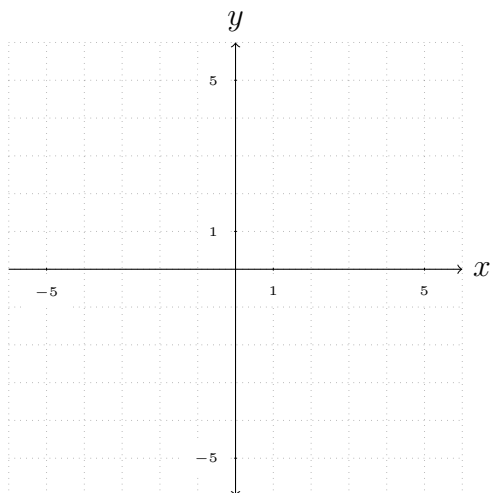
39.  $f(-3)$   $f(1)$

In exercises 49 - 57 odd, sketch a graph of  $y = f(x)$  on the provided coordinate plane.

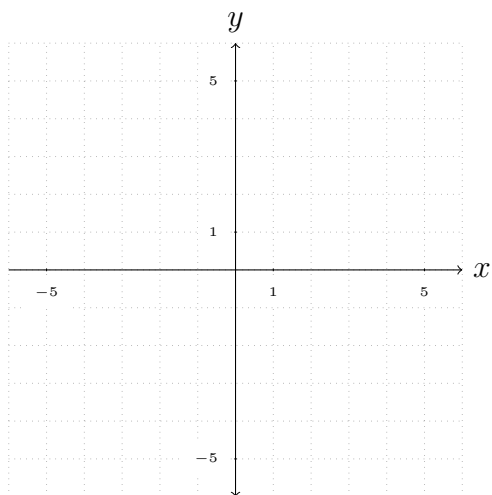
49.  $f(x) = 2$



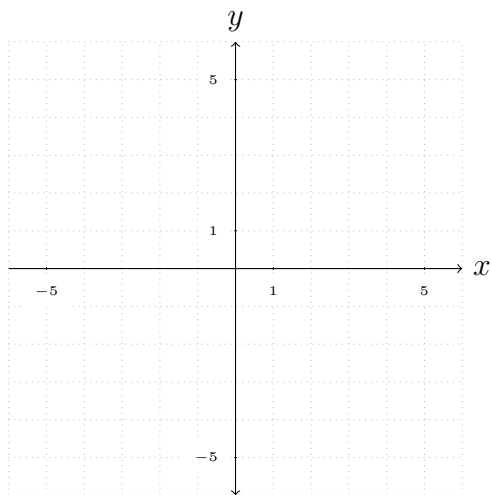
51.  $f(x) = -\frac{1}{2}x$



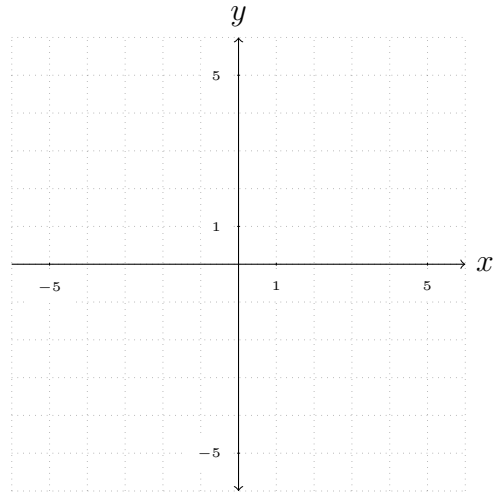
53.  $f(x) = x + 1$



55.  $f(x) = 3x - 3$



57.  $f(x) = 3 - x$



79. Let  $y = f(x)$  describe the temperature  $y$  of a room that is kept at  $70^\circ\text{F}$  for  $x$  hours.

a) Represent  $f$  symbolically and graphically over a 24-hour period for  $0 \leq x \leq 24$ .

b) Construct a table of  $f$  for  $x = 0, 4, 8, 12, \dots, 24$ .

c) What type of function is  $f$ ?

83. In 1960, the average American disposed of 2.7 pounds of garbage per day, whereas in 2003 this amount was 4.3 pounds per day.
- Find a linear function  $f$  that calculates the amount of garbage disposed of by a person in 1960 after  $x$  days. Find  $f(60)$  and interpret the result.
  - Repeat part (a) for 2003 with a linear function  $g$ .
85. As the number of smart mobile phones has increased, so has the number of malicious software viruses that affect these devices. In 2006 the total number  $N$  of *malware* viruses detected from January to July could be modeled by the formula  $N(x) = 16x + 136$ , where  $x = 1$  corresponds to January,  $x = 2$  to February, and so on.
- Use the window  $[1, 7, 1]$  by  $[0, 300, 100]$  to graph  $f$ . You do not need to sketch it here, only use the graph on your calculator to answer the following questions.
  - Discuss the trend in the graph.
  - Evaluate  $f(3)$  and interpret your result.
  - What does the number 16 in the formula indicate?

91. The table shows the average length of a major league baseball game in minutes for various years.

Year	2000	2001	2002
Length (minutes)	180	176	172

- a) What was the average length in 2000?
- b) By how many minutes did the average length change each year?
- c) Find a linear function  $f$  that models these data. Let  $x = 0$  correspond to 2000.
- d) Use  $f$  to predict the average length in 2004.