

2.2 Linear Functions

Basic Concepts
Representations of Linear Function
Modeling Data with Linear Functions

Key Terms

Use the vocabulary terms listed below to complete the statements in exercises 1-3.

constant function**linear function****nonlinear function**

1. A function f defined by $f(x) = ax + b$, where a and b are constants, is a _____.

2. $f(x) = x^2 + 4$ is an example of a(n) _____.

3. A(n) _____ can be written in the form $f(x) = b$.

Basic Concepts

Exercises 1-5: Determine whether f is a linear function. If f is a linear function, find values for a and b so that $f(x) = ax + b$.

1. $f(x) = 3 - \frac{1}{2}x$

1. _____

2. $f(x) = 4x$

2. _____

3. $f(x) = 2\sqrt{x} - 5$

3. _____

4. $f(x) = \frac{3}{x} - 7$

4. _____

5. $f(x) = 2x^2 + 1$

5. _____

Exercises 6-10: Use each table of values to determine whether $f(x)$ could represent a linear function. If f could be linear, write a formula for f in the form $f(x) = ax + b$.

6.

x	-2	-1	0	1	2
$f(x)$	-5	-3	-1	1	3

6. _____

7.

x	-2	-1	0	1	2
$f(x)$	4	1	0	1	4

7. _____

8.

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

8. _____

9.

x	-1	0	1	2	3
$f(x)$	-2	-3	-4	-5	-6

9. _____

10.

x	0	1	4	9	16
$f(x)$	0	-1	-2	-3	-4

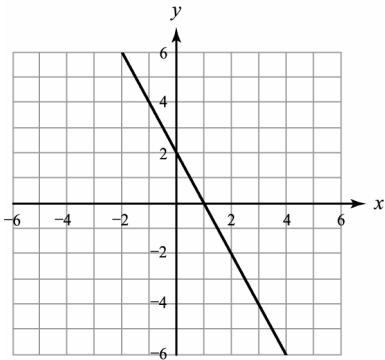
10. _____

Representations of Linear Functions

Exercises 11-15: Use the graph of f to evaluate, as specified.

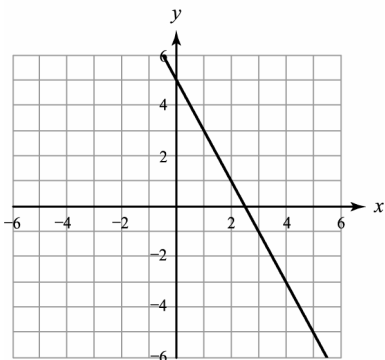
11. Evaluate $f(-1)$.

11. _____



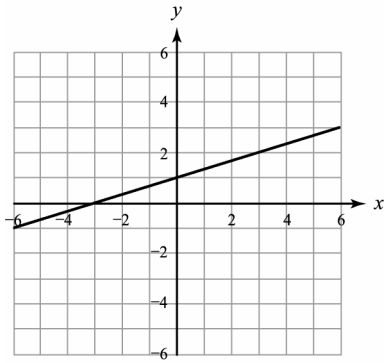
12. Evaluate $f(4)$.

12. _____



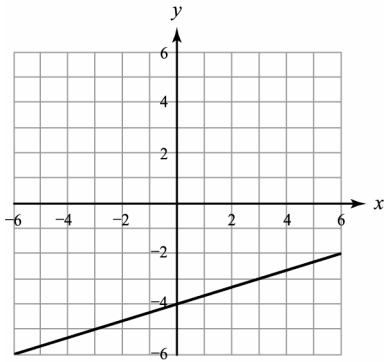
13. Evaluate $f(-3)$.

13. _____



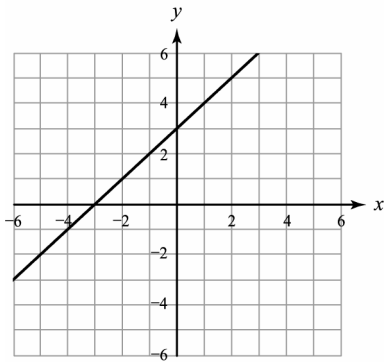
14. Evaluate $f(-3)$.

14. _____



15. Evaluate $f(-2)$.

15. _____

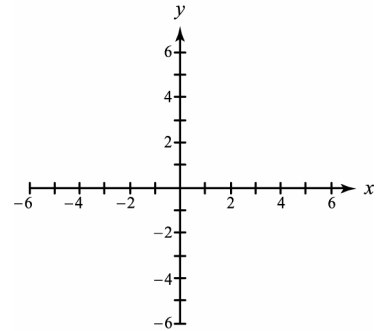


Exercises 16-20: Make a numerical representation (table) of f by letting $x = -1, 0, 1$.
Plot the points and sketch the graph of $y = f(x)$.

16. $f(x) = -3$

16.

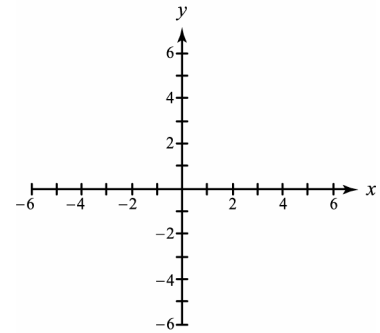
x	-1	0	1
$f(x)$			



17. $f(x) = -\frac{3}{2}x + 3$

17.

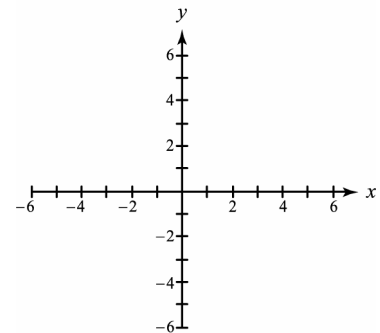
x	-1	0	1
$f(x)$			



18. $f(x) = x - 2$

18.

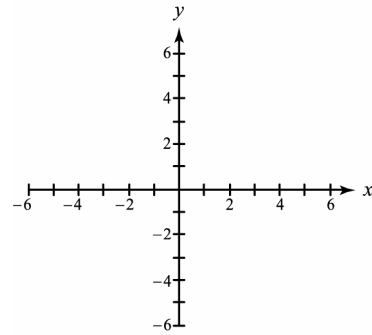
x	-1	0	1
$f(x)$			



19. $f(x) = -\frac{1}{3}x + 2$

19.

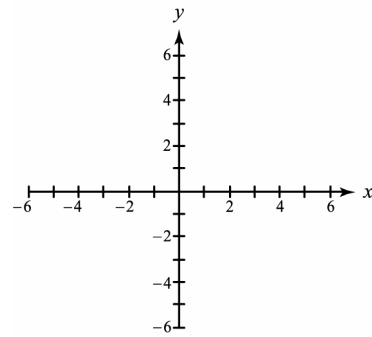
x	-1	0	1
$f(x)$			



20. $f(x) = x + 3$

20.

x	-1	0	1
$f(x)$			



Modeling Data with Linear Functions

Exercises 21-24: The table shows recommended cumulative weight loss over a 5-week period.

Week	0	1	2	3	4	5
Weight Loss (in lbs)	0	2	4	6	8	10

21. What is the recommended cumulative weight loss after 4 weeks?

21. _____

22. What is the recommended weekly weight loss?

22. _____

23. Find a linear function f that models the data. 23. _____

24. Use f to determine the recommended cumulative weight loss after 7 weeks. 24. _____

Exercises 25-26: The total cost to manufacture an item includes fixed cost of \$1200 and per item cost of \$75.

25. Find a formula for a linear function that models total cost. 25. _____

26. What is the total cost to manufacture 150 units? 26. _____

Exercises 27-28: The price of a children's buffet meal is \$1.50 plus \$0.20 per year over age 4.

27. Find a formula for a linear function that models price. 27. _____

28. What is the price for a buffet meal for a 10-year old child? 28. _____

Exercises 29-30: There are 3500 calories in one pound of fat.

29. Find a formula for a linear function that models the calories in x pounds. 29. _____

30. How many calories must you burn to lose 5 pounds? 30. _____