

1. The following table shows the relationship between s , the side length of an equilateral triangle, p , the perimeter of the triangle, and A , the area of the triangle.

| | | | | | |
|-----|-------|-------|-------|-------|-------|
| s | 1 | 2 | 3 | 4 | 5 |
| p | 3 | 6 | 9 | 12 | 15 |
| A | 0.217 | 0.433 | 0.650 | 0.866 | 1.083 |

If p is a linear function of s , give its rate of change. If it is not linear, enter "not linear".
 Ans: 3

Learning Objective: Decide whether a given function is linear. difficulty: medium

2. A salesman earns $W(n) = 500 + 175n$, where n is the number of products sold, and $W(n)$ is the weekly wage in dollars. What does the number 500 represent? (Mark all that apply)

- A) The slope
- B) The vertical intercept
- C) The salesman's base salary
- D) The salesman's commission for each product sold

Ans: B, C Learning Objective: Recognize linear functions and find and interpret their slope and vertical intercept. difficulty: medium

3. The distance traveled by a car is $D(t) = 50t$ miles, where t is the number of hours driven. What is the slope?

Ans: 50

Learning Objective: Recognize linear functions and find and interpret their slope and vertical intercept. difficulty: medium

4. The distance traveled by a car is $D(t) = 65t$ miles, where t is the number of hours driven. What is the meaning of the number 65? (Mark all that apply)

- A) The vertical intercept
- B) The slope
- C) The total distance traveled
- D) The speed of the car

Ans: B, D Learning Objective: Recognize linear functions and find and interpret their slope and vertical intercept. difficulty: medium

5. Could the following table represent a linear function?

| | | | | | |
|--------|-------|-------|-------|-------|-------|
| t | 0 | 10 | 20 | 30 | 40 |
| $p(t)$ | 2,000 | 2,800 | 3,200 | 3,400 | 3,500 |

Ans: no

Learning Objective: Decide whether a given function is linear. difficulty: easy

6. Could the following table represent a linear function?

| | | | | | |
|--------|-----|-----|-----|-----|-----|
| x | 10 | 20 | 30 | 40 | 50 |
| $f(x)$ | 920 | 860 | 800 | 740 | 680 |

Ans: yes

Learning Objective: Decide whether a given function is linear. difficulty: easy

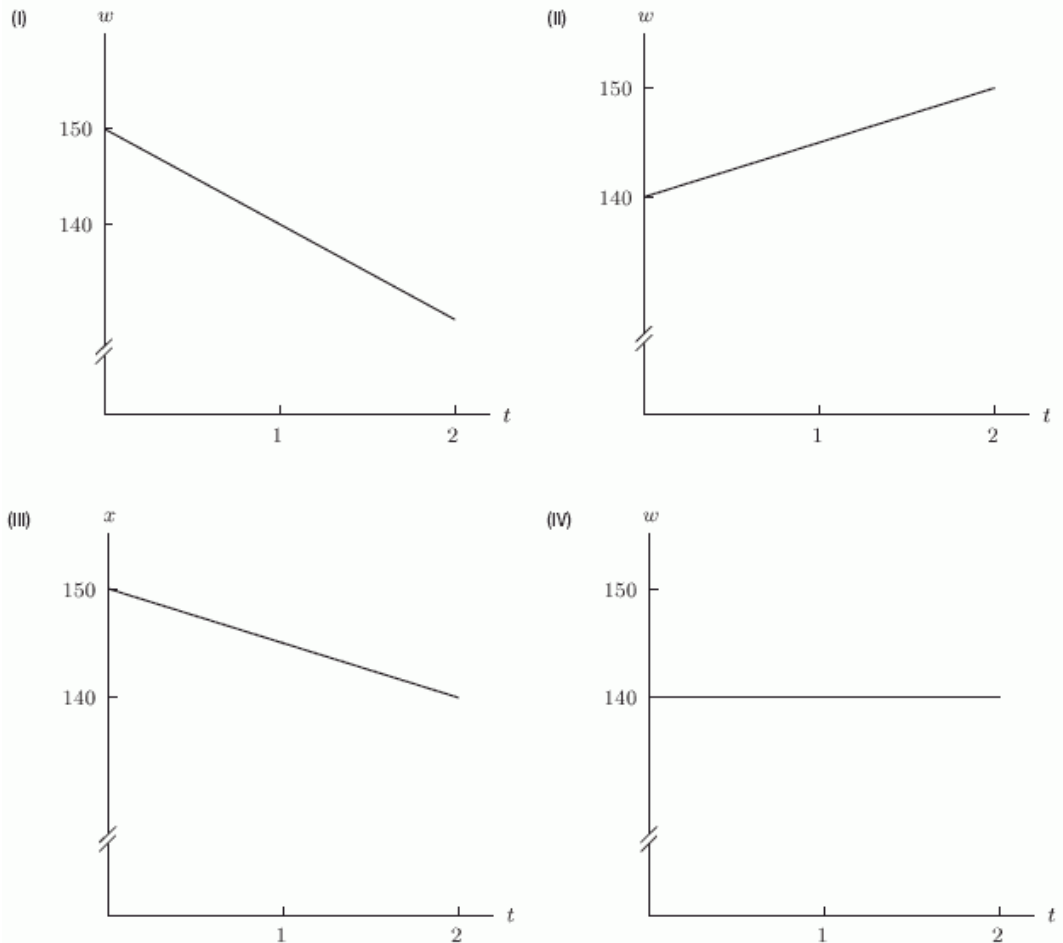
7. Could the following table represent a linear function?

| | | | | | |
|--------|-----|------|-----|------|------|
| t | 0 | 100 | 300 | 500 | 1000 |
| $g(t)$ | 4.2 | 4.45 | 4.7 | 4.95 | 5.2 |

Ans: no

Learning Objective: Decide whether a given function is linear. difficulty: medium

8. Which of the following figures shows the graph of a person's weight, w , as a function of time t , in months if the person starts out at 150 pounds and loses 5 pounds a month?



Ans: III

Learning Objective: Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: easy

9. One of the functions represented in the table below is linear. What is its vertical intercept?

| x | $f(x)$ | $g(x)$ |
|-----|--------|--------|
| 1 | 2.1 | 2.6 |
| 2 | 3.2 | 2.9 |
| 3 | 4.3 | 3.2 |
| 4 | 6.5 | 3.5 |
| 5 | 8.7 | 3.8 |
| 6 | 10.9 | 4.1 |

Ans: 2.3

Learning Objective: Decide whether a given function is linear. difficulty: medium

10. For the line $y + 4 = 3x - 6$,
- what is the slope of the line?
 - what is the y-intercept of the line?

Ans: a) 3

b) -10

Learning Objective: Recognize linear functions and find and interpret their slope and vertical intercept. difficulty: easy

11. A cookie store has a fixed monthly cost of \$540. It costs the cookie store \$0.20 to make a cookie and the store sells each cookie for \$1.40. Express revenue R , cost C , and profit P for the cookie store when making and selling x cookies in a month.

Ans: $R(x) = 1.40x$

$C(x) = 540 + 0.20x$

$P(x) = 1.40x - 0.20x - 540 = 1.20x - 540$

Learning Objective: Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: hard

12. A certain baseball card's value is given by $V = 1 + 4.6t$ where t is the number of years after the card was issued. Interpret the constants 1 and 4.6.

Ans: The constant 1 is the initial value of the baseball card.

The constant 4.6 is the amount by which the value of the card increased each year.

Learning Objective: Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: medium

13. The population of a pack of rats can be represented by the formula $P(t) = 3 + 1.3t$ where $P(t) = 3 + 1.3t$ represents the population in hundreds, and t represents the time, in months, since January 2010. Which of the following is correct regarding the vertical intercept?

A) Since the vertical intercept is 3, we know that in January 2010 there were 300 rats.
 B) Since the vertical intercept is 3, we know that in January 2010 there were 3 rats.
 C) Since the vertical intercept is 1.3, we know that in January 2010 there were 130 rats.
 D) Since the vertical intercept is 0, we know that in January 2010 there were no rats.

Ans: A Learning Objective: Find and interpret the initial value and rate of change of a given linear function. difficulty: medium

14. The population of a pack of rats can be represented by the formula $P(t) = 2 + 1.3t$ where $P(t) = 2 + 1.3t$ represents the population in hundreds, and t represents the time, in months, since January 2010. Which of the following is correct regarding the slope.

A) Since the slope is 1.3, we know that the population is increasing by 130 rats per month.
 B) Since the slope is 2, we know that the population is increasing by 200 rats per month.
 C) Since the vertical intercept is 1.3, we know that the population is increasing by approximately 1.3 rats per month.
 D) Since the slope is 1.3, we know that the population is increasing by 130 rats per year.

Ans: A Learning Objective: Find and interpret the initial value and rate of change of a given linear function. difficulty: medium

15. A wildlife ranger finds that there is a linear relationship between the number of bushels of corn distributed in a month and the number of deer at the park. If the ranger distributes no bushels of corn, there are 49 deer at the park. For each additional bushel of corn distributed, 8 more deer come to the park.

a) If d is the number of deer at the park and b is the number of bushels of corn fed in a month, find a formula for d in terms of b .
 b) How many deer are at the park if the ranger feeds 3 bushels of corn?
 c) How many bushels of corn must be distributed in order to have 81 deer at the park?

Ans: a) $d = 8 * b + 49$

b) 73 deer

c) 4 bushels must be distributed.

Learning Objective: Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: medium

16. A wildlife ranger finds that there is a linear relationship between the number of bushels of corn distributed in a month and the number of deer at the park. If the ranger distributes no bushels of corn, there are 49 deer at the park. For each additional bushel of corn distributed, 7 more deer come to the park.

How many bushels of corn must be distributed in order to have 77 deer at the park?

- A) 4 bushels must be distributed.
- B) 588 bushels must be distributed.
- C) 2 bushels must be distributed.
- D) 5 bushels must be distributed.

Ans: A Learning Objective: Find and interpret the initial value and rate of change of a given linear function.; Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: medium

17. It costs a band \$550 to pay to rent a hall. They sell tickets for \$20. Express the profit, P , as a function of the number of people, n , attending the concert.

Ans: $P = 20n - 550$

Learning Objective: Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: medium

18. It costs a band \$550 to pay to rent a hall. They sell tickets for \$10. How much profit, P , will the band make if 300 people are attending the concert?

Ans: \$2,450

Learning Objective: Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: hard

19. It costs \$15 to operate a lemonade stand, while a cup of lemonade sells for \$0.75. Which of the following expresses the profit, P , as a function of the number of cups, c , of lemonade sold.

- A) $P = 0.75c - 15$
- B) $P = 0.75c + 15$
- C) $P = 15.75c$
- D) $P = 0.75c$

Ans: A Learning Objective: Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: medium

20. It costs \$10 to operate a lemonade stand, while a cup of lemonade sells for \$0.25. How many cups of lemonade must be sold in order to have \$13.25 in profit?

Ans: 93

Learning Objective: Find and interpret the initial value and rate of change of a given linear function.; Represent a linear function using a table, graph, or formula, given the rate of change and an initial value. difficulty: hard

21. What is the slope of the line $y = \frac{5}{6}x + 1$?

Ans: $\frac{5}{6}$

Learning Objective: Find and interpret the initial value and rate of change of a given linear function. difficulty: easy