

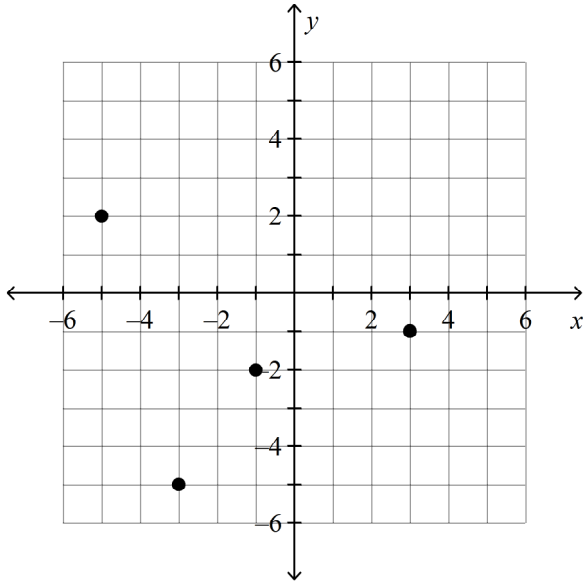
### Functions Relations and Word Problems #5

#### Short Answer

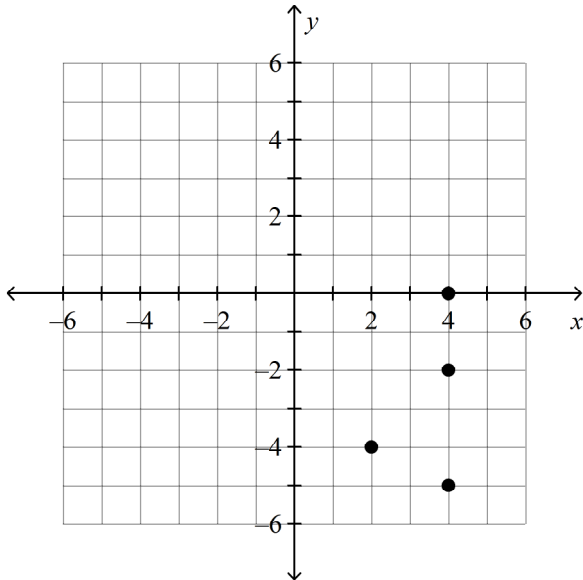
1. Find the range of  $f(x) = -x + 4$  for the domain  $\{-3, -2, -1, 1\}$ .

Use the vertical line test to determine whether the relation is a function.

2.  $\{(-1, -2), (3, -1), (-5, 2), (-3, -5)\}$



3.  $\{(4, 0), (4, -5), (4, -2), (2, -4)\}$

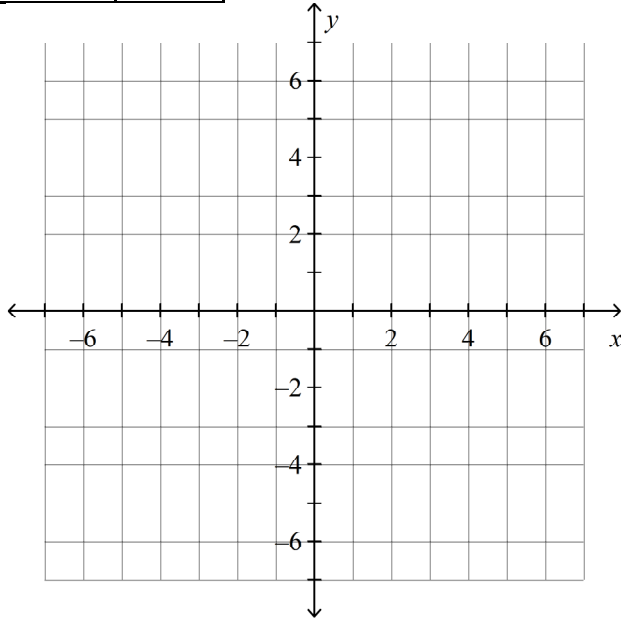


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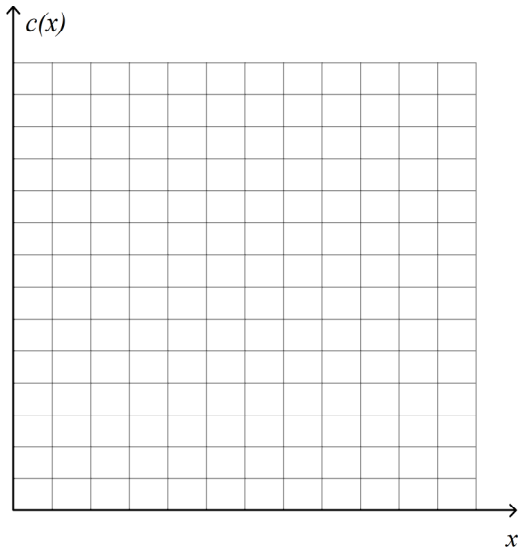
4. Model the function rule  $y = 3x + 0$  with a table of values and a graph.

$x$	$y$
-1	
0	
1	



5. Elaine is in the business of repairing home computers. She charges a base fee of \$45 for each visit and \$25 per hour for her labor. The total cost  $c(x)$  for a home visit and  $x$  hours of labor is modeled by the function rule  $c(x) = 45 + 25x$ . Use the function rule to make a table of values and a graph.

$x$	$c(x)$
0	
1	
2	
3	



6. An employee receives a weekly salary of \$340 and a 6% commission on all sales.
- Write a rule to describe the function  $f(d)$  that gives weekly earnings in terms of  $d$  dollars in sales.
  - Find the employee's earnings for a week with \$660 total sales.
  - What were the employee's total sales for a week in which her earnings were \$1300?

**For the data in the table, tell whether  $y$  varies directly with  $x$ . If it does, write an equation for the direct variation.**

7.

$x$	$y$
2	-6.6
3	-9.9
4	-13.2
5	-16.5

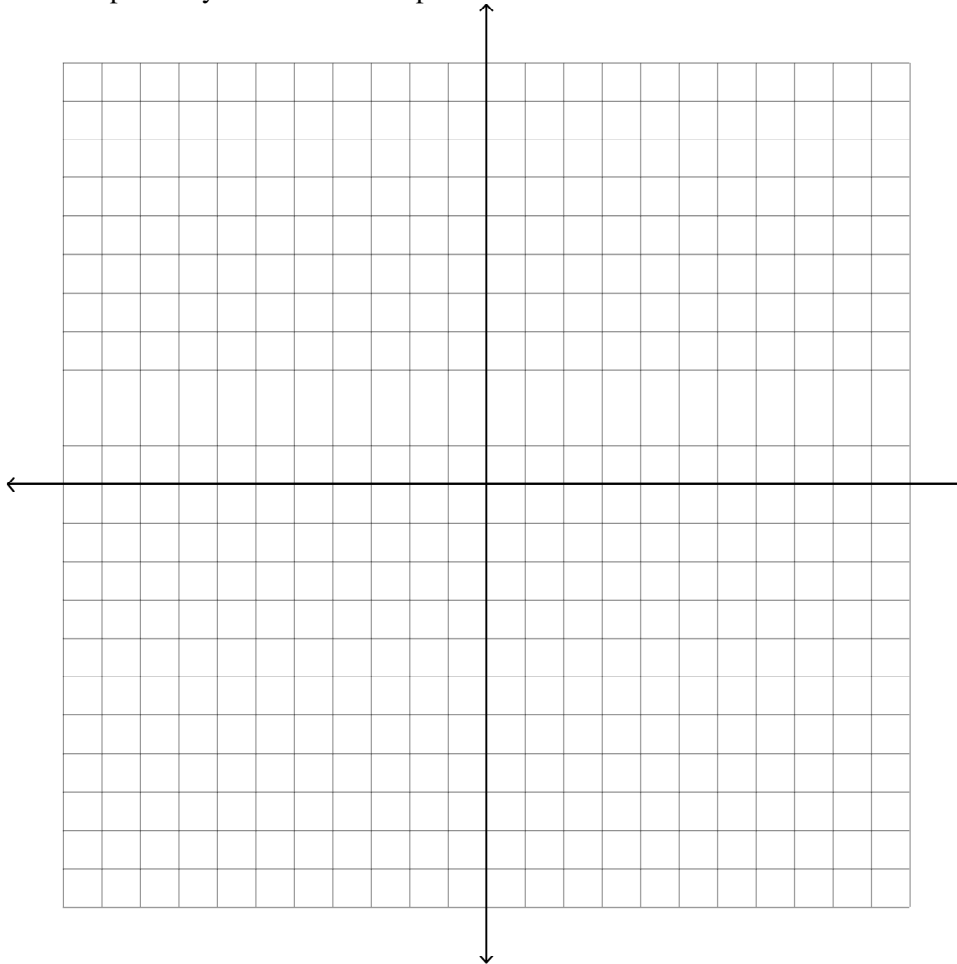
**Is the equation a direct variation? If it is, find the constant of variation.**

8.  $x - 6y = 0$

9. A biologist records the number of microbes growing in a culture at the times listed in the table. If the microbes continue to multiply at this rate, how many will there be at 6 P.M. on the second day?

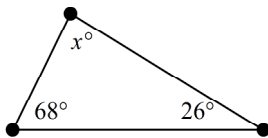
Time of Observation	Number of Microbes
Day 1, 12:00 noon	12,000
Day 1, 6:00 P.M.	18,000
Day 2, 12:00 midnight	27,000
Day 2, 6:00 A.M.	40,500

10. A local citizen wants to fence a rectangular community garden. The length of the garden should be at least 110 ft, and the distance around should be no more than 380 ft.
- Write a system of inequalities that models the possible dimensions of the garden.
  - Graph the system to show all possible solutions.



11. You are driving to visit a friend in another state who lives 440 miles away. You are driving 55 miles per hour and have already driven 275 miles. Write and solve an equation to find how much longer in hours you must drive to reach your destination.
12. A customer went to a garden shop and bought some potting soil for \$17.50 and 4 shrubs. The total bill was \$53.50. Write and solve an equation to find the price of each shrub.

13. Steven wants to buy a \$565 bicycle. Steven has no money saved, but will be able to deposit \$30 into a savings account when he receives his paycheck each Friday. However, before Steven can buy the bike, he must give his sister \$65 that he owes her. For how many weeks will Steven need to deposit money into his savings account before he can pay back his sister and buy the bike?
14. Determine whether the statement is *sometimes*, *always* or *never* true.  
If  $ax + b - 4 = b$  and  $a \neq 0$  then  $x = \frac{4}{a}$ .
15. John and 2 friends are going out for pizza for lunch. They split one pizza and 3 large drinks. The pizza cost \$14.00. After using a \$7.00 gift certificate, they spend a total of \$12.10. Write an equation to model this situation, and find the cost of one large drink.
16. Find the measure of  $\angle x$ . (Hint: The sum of the measures of the angles in a triangle is  $180^\circ$ .)



## Functions Relations and Word Problems #5

### Answer Section

#### SHORT ANSWER

1. ANS:

{7, 6, 5, 3}

PTS: 1

DIF: L2

REF: 4-3 Function Rules, Tables, and Graphs

OBJ: 4-3.1 Function Rules to Tables and Graphs

STA: CA A1 16.0 | CA A1 17.0 | CA A1 18.0

TOP: 4-3 Example 1

KEY: function | domain | range

2. ANS:

The relation is a function.

PTS: 1

DIF: L2

REF: 4-2 Relations and Functions

OBJ: 4-2.1 Identifying Functions

STA: CA A1 16.0 | CA A1 17.0 | CA A1 18.0

TOP: 4-2 Example 3

KEY: function | vertical-line test

3. ANS:

The relation is not a function.

PTS: 1

DIF: L2

REF: 4-2 Relations and Functions

OBJ: 4-2.1 Identifying Functions

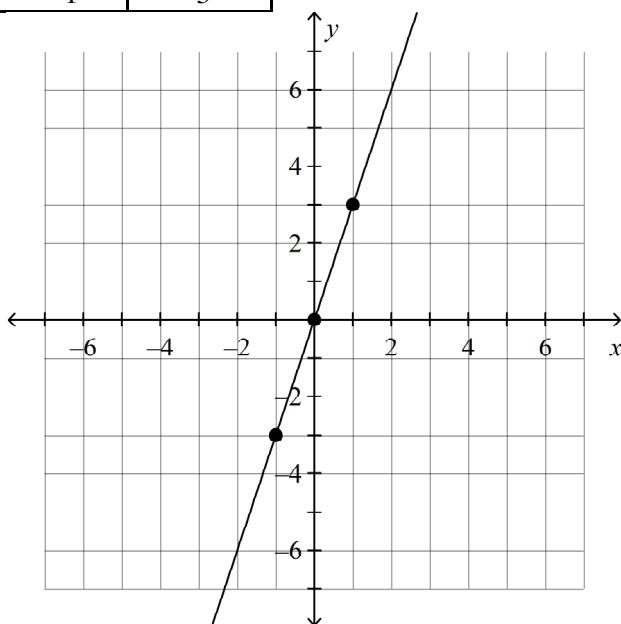
STA: CA A1 16.0 | CA A1 17.0 | CA A1 18.0

TOP: 4-2 Example 3

KEY: function | vertical-line test

4. ANS:

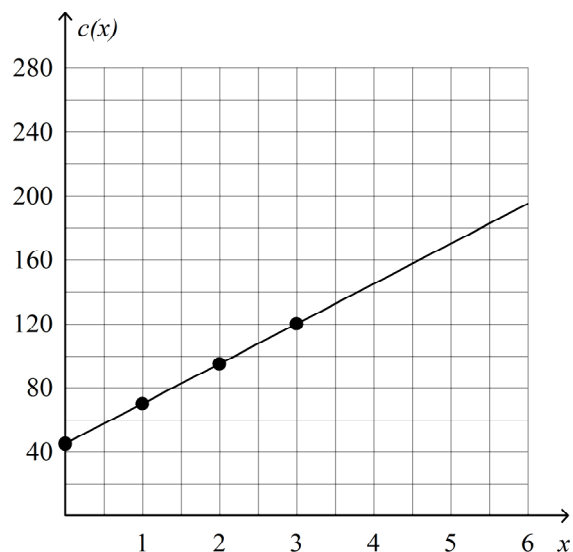
$x$	$y$
-1	-3
0	0
1	3



PTS: 1      DIF: L2      REF: 4-3 Function Rules, Tables, and Graphs  
OBJ: 4-3.1 Function Rules to Tables and Graphs  
STA: CA A1 16.0 | CA A1 17.0 | CA A1 18.0      TOP: 4-3 Example 2  
KEY: function | graphing

5. ANS:

$x$	$c(x)$
0	45
1	70
2	95
3	120



PTS: 1                    DIF: L2                    REF: 4-3 Function Rules, Tables, and Graphs

OBJ: 4-3.1 Function Rules to Tables and Graphs

STA: CA A1 16.0 | CA A1 17.0 | CA A1 18.0

TOP: 4-3 Example 3

KEY: function | graphing | word problem | problem solving

6. ANS:

a.  $f(d) = 340 + 0.06d$

b. \$379.60

c. \$16,000

PTS: 1                    DIF: L4                    REF: 4-4 Writing a Function Rule

OBJ: 4-4.1 Writing Function Rules                    STA: CA A1 16.0

KEY: function | multi-part question | word problem | problem solving

7. ANS:

yes;  $y = -3.3x$ 

PTS: 1                    DIF: L3                    REF: 4-5 Direct Variation

OBJ: 4-5.2 Proportions and Equations of Direct Variations                    STA: CA A1 15.0 | CA A1 16.0

TOP: 4-5 Example 4

KEY: direct and inverse variation



8. ANS:

yes;  $\frac{1}{6}$ 

PTS: 1

DIF: L2

REF: 4-5 Direct Variation

OBJ: 4-5.2 Proportions and Equations of Direct Variations STA: CA A1 15.0 | CA A1 16.0

TOP: 4-5 Example 4

KEY: direct and inverse variation

9. ANS:

91,125 microbes

PTS: 1

DIF: L4

REF: 4-7 Describing Number Patterns

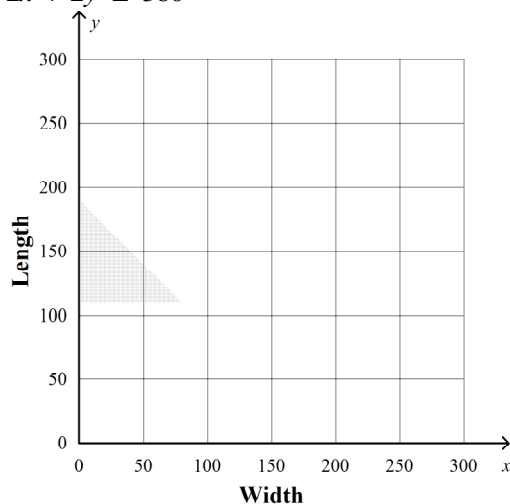
OBJ: 4-7.1 Inductive Reasoning and Number Patterns STA: CA A1 24.1

KEY: pattern | number pattern | inductive reasoning

10. ANS:

a. Let  $x$  = width of the garden.Let  $y$  = length of the garden. $y \geq 110$  $2x + 2y \leq 380$ 

b.



PTS: 1

DIF: L2

REF: 6-6 Systems of Linear Inequalities

OBJ: 6-6.2 Writing and Using Systems of Linear Inequalities STA: CA A1 9.0

TOP: 6-6 Example 3

KEY: word problem | problem solving | linear inequality | graphing | system of linear inequalities | graphing a system of linear inequalities

11. ANS:

 $55h + 275 = 440; h = 3$ 

PTS: 1

DIF: L2

REF: 2-1 Solving Two-Step Equations

OBJ: 2-1.1 Solving Two-Step Equations STA: CA A1 5.0 | CA A1 25.0

TOP: 2-1 Example 2

KEY: Addition and Subtraction Properties of Equality | Multiplication and Division Properties of Equality | two-step equation | equivalent equations | inverse operations | solution of the equation | solving equations | problem solving | word problem

12. ANS:  
 $4p + \$17.50 = \$53.50; p = \$9.00$
- PTS: 1                    DIF: L2                    REF: 2-1 Solving Two-Step Equations  
 OBJ: 2-1.1 Solving Two-Step Equations    STA: CA A1 5.0 | CA A1 25.0  
 TOP: 2-1 Example 2  
 KEY: Addition and Subtraction Properties of Equality | Multiplication and Division Properties of Equality | two-step equation | equivalent equations | inverse operations | solution of the equation | solving equations | problem solving | word problem
13. ANS:  
 21 weeks
- PTS: 1                    DIF: L4                    REF: 2-1 Solving Two-Step Equations  
 OBJ: 2-1.1 Solving Two-Step Equations    STA: CA A1 5.0 | CA A1 25.0  
 KEY: Addition and Subtraction Properties of Equality | Multiplication and Division Properties of Equality | two-step equation | equivalent equations | inverse operations | solution of the equation | solving equations | problem solving | word problem
14. ANS:  
 always
- PTS: 1                    DIF: L3                    REF: 2-1 Solving Two-Step Equations  
 OBJ: 2-1.2 Using Deductive Reasoning    STA: CA A1 5.0 | CA A1 25.0  
 KEY: deductive reasoning | solving equations | reasoning | always sometimes never
15. ANS:  
 $3d + \$14.00 - \$7.00 = \$12.10; \$1.70$
- PTS: 1                    DIF: L3                    REF: 2-2 Solving Multi-Step Equations  
 OBJ: 2-2.1 Using the Distributive Property to Combine Like Terms  
 STA: CA A1 2.0 | CA A1 4.0 | CA A1 5.0                    TOP: 2-2 Example 2  
 KEY: Addition and Subtraction Properties of Equality | Multiplication and Division Properties of Equality | solving equations | multi-step equation | problem solving | word problem
16. ANS:  
 $86^\circ$
- PTS: 1                    DIF: L2                    REF: 2-2 Solving Multi-Step Equations  
 OBJ: 2-2.1 Using the Distributive Property to Combine Like Terms  
 STA: CA A1 2.0 | CA A1 4.0 | CA A1 5.0                    TOP: 2-2 Example 2  
 KEY: Addition and Subtraction Properties of Equality | Multiplication and Division Properties of Equality | solving equations | two-step equation