

# Functions

A **function** is a relationship between two sets of numbers. Each number,  $x$ , in one set, the **domain**, is matched with exactly one number,  $y$ , in the other set, called the **range**. The matched numbers are written as **ordered pairs**,  $(x, y)$ .

Read this problem. Answer each question.

A cross-country team gets 10 points for each 1st place finish, 6 points for 2nd, 4 points for 3rd, 2 points for 4th, 1 point for 5th, and no points for 6th place and higher. The table shows this relationship.

Place	1	2	3	4	5	6
Points	10	6	4	2	1	0

- 1 What two quantities are being compared? \_\_\_\_\_
- 2 What happens to the numbers in the second set as the numbers in the first set increase by 1? \_\_\_\_\_
- 3 Do the two number sets form a function? Explain. \_\_\_\_\_  
\_\_\_\_\_
- 4 Which number set is the domain? Write its members. \_\_\_\_\_
- 5 Which number set is the range? Write its members. \_\_\_\_\_
- 6 Write the ordered pairs for this relationship. \_\_\_\_\_
- 7 What ordered pair would represent 7th place? \_\_\_\_\_ Is this  $y$ -value unique? \_\_\_\_\_  
What does this tell you about  $y$ -values in a function? \_\_\_\_\_  
\_\_\_\_\_



## INDEPENDENT PRACTICE

Identify the domain and range for each set of ordered pairs.

8  $\{(0, 1), (2, 3), (4, 9), (5, 12), (7, 15)\}$

domain: \_\_\_\_\_

range: \_\_\_\_\_

9  $\{(-10, 5), (-5, 6), (0, 7), (5, 8), (10, 9)\}$

domain: \_\_\_\_\_

range: \_\_\_\_\_

10  $\{(3, 0.1), (2, 0.2), (2, 0.3), (0, 0.3)\}$

domain: \_\_\_\_\_

range: \_\_\_\_\_

11  $\{(-1.2, 5), (-2.2, 3), (-3.3, 3), (-4.4, 1)\}$

domain: \_\_\_\_\_

range: \_\_\_\_\_

Answer the question.

- 12** Any set of ordered pairs is a **relation**. A relation is a function **if** the  $x$ -values are unique and each one corresponds to one and only one  $y$ -value. Are any of the relations shown in problems 8–11 **not** functions? Explain why.

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Decide if each set of ordered pairs is a function. Circle yes or no.

- 13**  $\{(0, 1), (1, 3), (2, 5), (3, 7), (4, 9)\}$

yes          no

- 15**  $\{(9, 0.1), (8, 0.2), (7, 0.3), (6, 0.3)\}$

yes          no

- 17**  $\left\{\left(5\frac{1}{5}, -2\frac{1}{2}\right), \left(5\frac{1}{5}, -1\frac{1}{3}\right)\right\}$

yes          no

- 14**  $\{(-8, 5), (-4, 6), (0, 7), (4, 8), (8, 9)\}$

yes          no

- 16**  $\{(-1.5, 5), (-2.5, 3), (-3.5, 3), (-4.5, 1)\}$

yes          no

- 18**  $\left\{\left(\frac{1}{2}, \frac{3}{4}\right), \left(\frac{1}{3}, \frac{3}{4}\right), \left(\frac{1}{4}, \frac{3}{4}\right), \left(\frac{1}{5}, \frac{3}{4}\right)\right\}$

yes          no

Complete each table to make a function or a relation as indicated.

- 19** function

<b>x</b>	0.1	0.2		0.4
<b>y</b>	1		3	4

- 20** relation

<b>x</b>		3		5
<b>y</b>	6	5		3

- 21** relation

<b>x</b>	1		2	
<b>y</b>	9		8	

- 22** function

<b>x</b>	0.5	1	1.5	
<b>y</b>	0.5		1.5	2

- 23** function

<b>x</b>		3	4	5
<b>y</b>	1	1		1

- 24** relation

<b>x</b>		2		
<b>y</b>	0.1	0.2	0.3	

Answer the question.

- 25** A skateboard shop rents skateboards for a \$10 rental fee plus \$3 per hour. Is this a function? Explain.

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Name \_\_\_\_\_ Date \_\_\_\_\_

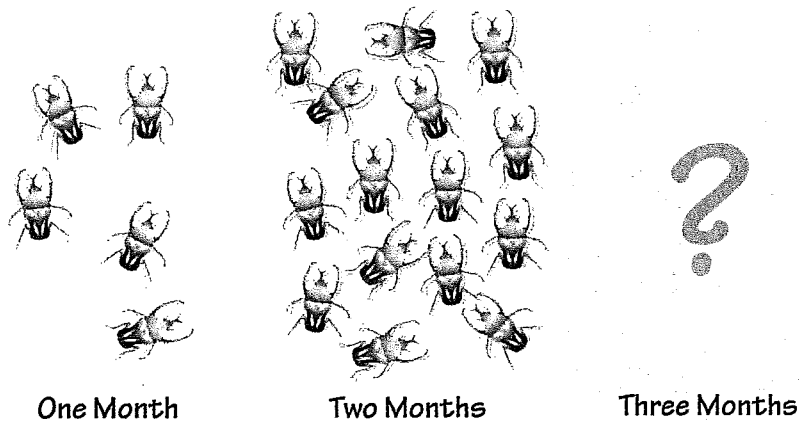
Brent wants to buy a 60" LED Smart TV, so he opened a savings account and added money to it every month. The chart below shows the relationship between the number of months Brent has been saving and the total amount of money in his account.

Savings Account

Number of Months	Total Savings
1	\$160
4	\$415
6	\$585
9	\$840
12	\$1,095

1. Determine the rate of change for this relationship and explain what it means in terms of Brent's savings account.
  
  
  
  
  
  
  
  
  
  
2. Determine the initial value for this relationship and explain what it means in terms of Brent's savings account.

4. As a biology project, Talisha is studying the growth of a beetle population. She starts her experiment with 5 beetles. The next month she counts 15 beetles.



- Suppose the beetle population is growing linearly. How many beetles can Talisha expect to find after 2, 3, and 4 months?
- Suppose the beetle population is growing exponentially. How many beetles can Talisha expect to find after 2, 3, and 4 months?
- Write an equation for the number of beetles  $b$  after  $m$  months if the beetle population is growing linearly. Explain what information the variables and numbers represent.
- Write an equation for the number of beetles  $b$  after  $m$  months if the beetle population is growing exponentially. Explain what information the variables and numbers represent.
- How long will it take the beetle population to reach 200 if it is growing linearly?
- How long will it take the beetle population to reach 200 if it is growing exponentially?

8. a. Fill in the table for each equation.

$y = 50(2.2)^x$						
$x$	0	1	2	3	4	5
$y$	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

$y = 350(1.7)^x$						
$x$	0	1	2	3	4	5
$y$	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

- What is the growth factor for each equation?
- Predict whether the graphs of these equations will ever cross.
- Estimate any points at which you think the graphs will cross.