~ Section 4.1 Notes ~
Graphing Relationships

TLW match simple graphs with situations

TLW graph a relationship

TLW describe relationships as increasing, decreasing or constant

State whether each word or phrase represents an amount that is increasing, decreasing, or constant.

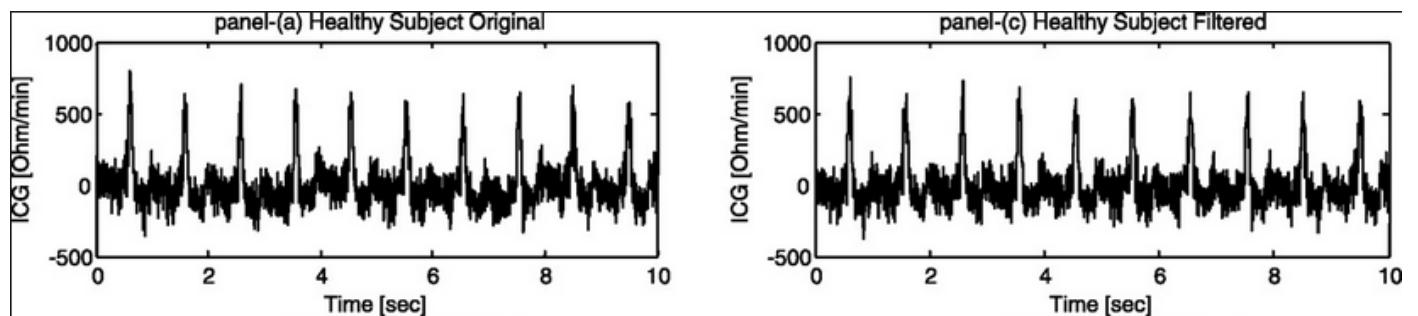1. Stays the same   2. Rises   3. Drops   4. Slows down

Graphs can be used to illustrate many different situations.
For example, trends shown on a cardiograph can help a doctor see how a patient's heart is functioning.
To relate a graph to a given situation, use key words in the description.

Example 1 – Relating Graphs to Situations
Each day several leaves fall from a tree. One day a gust of wind blows off many leaves. Eventually, there are no more leaves on the tree. Choose the graph that best represents the situation.
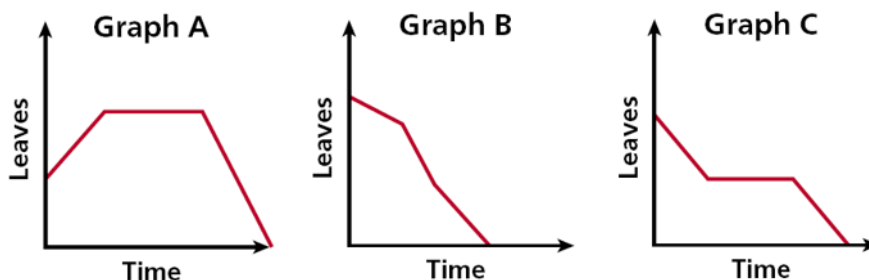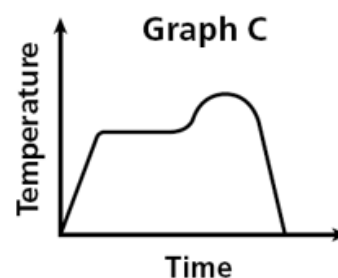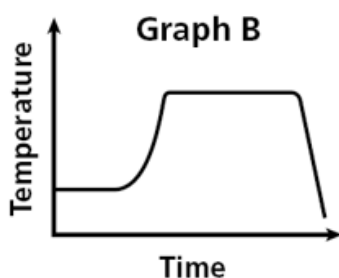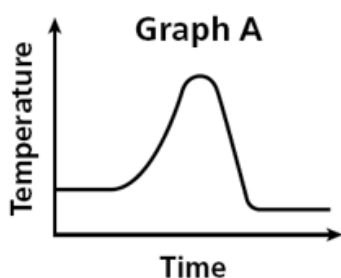
Fill in the table based on the above example.

Key Words	Segment Description	Graphs...
Each day several leaves fall	Never horizontal	
Wind blows off many leaves	Slanting downward rapidly	
Eventually no more leaves	Slanting downward until reaches zero	

Example 2
The air temperature increased steadily for several hours and then remained constant. At the end of the day, the temperature increased slightly before dropping sharply. Choose the graph that best represents this situation.


Fill in the table based on the above example.

Key Words	Segment Description	Graphs...
Increased steadily	Slanting upward	
Remained constant	Horizontal	
Increased slightly before dropping sharply	Slanting upward and then steeply downward	

As seen in Example 1, some graphs are connected lines or curves called _____.

Some graphs are only distinct points. They are called _____.

2

Theme Park Attendance

The graph on theme park attendance is an example of a discrete graph. It consists of distinct points because each year is distinct and people are counted in whole numbers only. The values between whole numbers are not included, since they have no meaning for the situation.
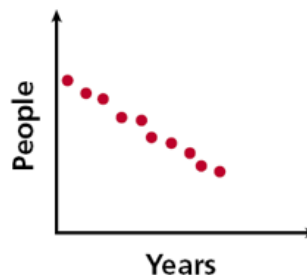
Sketching Graphs for Situations

Example 1
Sketch a graph for the situation. Tell whether the graph is continuous or discrete.
A truck driver enters a street, drives at a constant speed, stops at a light, and then continues.

As time passes during the trip (moving left to right along the x-axis) the truck's speed (y-axis) does the following:

- initially increases
- remains constant
- decreases to a stop
- increases
- remains constant
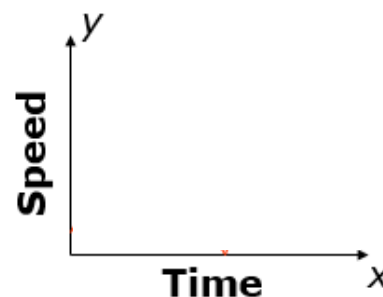
The graph is _____.

Example 2
Tell whether the graph is continuous or discrete.
A small bookstore sold between 5 and 8 books each day for 7 days.

The graph is _____.

<u>Guided Practice</u>
Sketch a graph for the situation. Tell whether the graph is continuous or discrete.

1. Jamie is taking an 8-week keyboarding class. At the end of each week, she takes a test to find the number of words she can type per minute. She improves each week.

Keyboarding

Words per minute

| 60
| 55
| 50
| 45
| 40
| 35
| 30
| 25
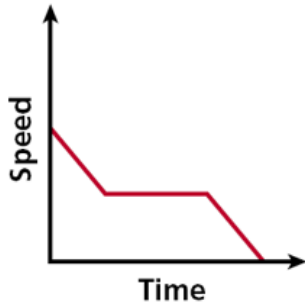| 20
| 15
| 10
| 5

1 2 3 4 5 6 7 8
Weeks
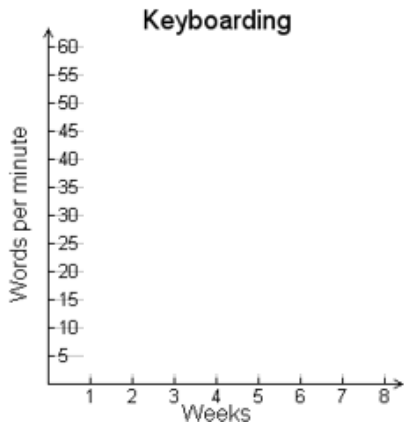
The graph is _____.

2. Henry begins to drain a water tank by opening a valve. Then he opens another valve. Then he closes the first valve. He leaves the second valve open until the tank is empty.

Water tank
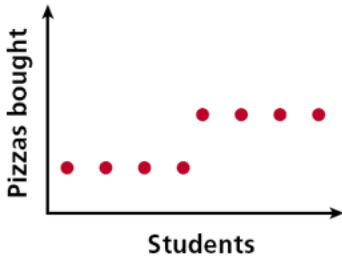
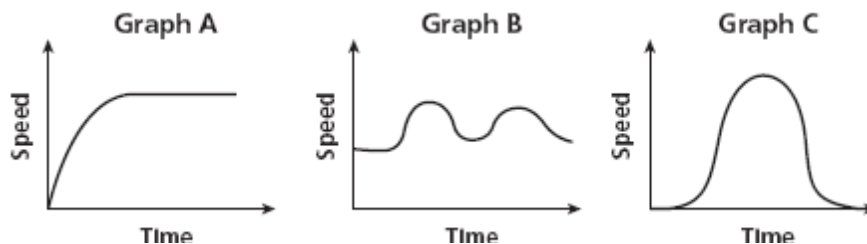Water Level

Time
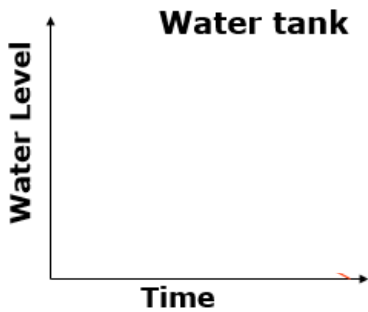
The graph is _____.

3. Write a possible situation for the given graph.

Speed

Time

_____
_____
_____
_____
_____

4. Write a possible situation for the given graph.

Pizzas bought

Students

_____
_____
_____
_____

4

Choose the graph that best represents each situation. Write A, B, or C on the line provided.

| Graph A | Graph B | Graph C |

1.) A person alternates between running and walking.   _____

2.) A person gradually speeds up to a constant running pace.   _____

3.) A person walks, gradually speeds up to a run, and then slows back down to a walk.   _____

Choose the graph that best represents each situation. Write A, B, or C on the line provided.

4.) A flag is raised up a flagpole quickly at the beginning and then more   _____
   slowly near the top.

5.) A flag is raised up a flagpole in a jerky motion, using a hand-over-hand method.   _____

6.) A flag is raised up a flagpole at a constant rate of speed.   _____
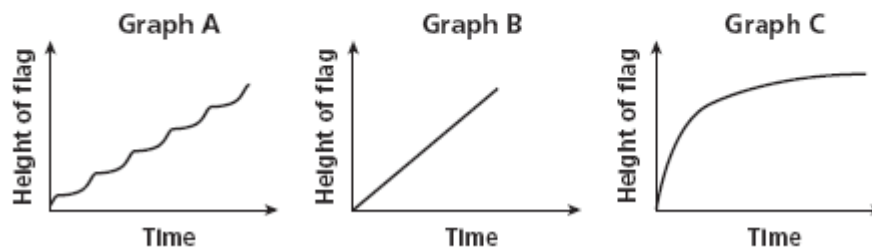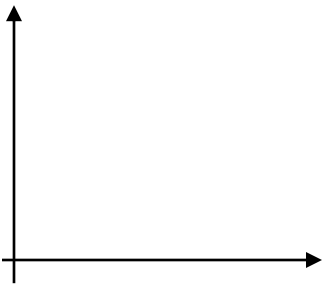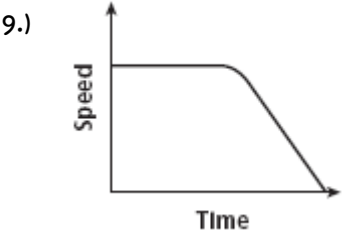
Graph the following situations.

7.) Maddie is buying extra pages for her photo album. Each page holds exactly 8 photos. Sketch a graph to show the maximum number of photos she can add to her album if she buys 1, 2, 3, or 4 extra pages. Tell whether the graph is continuous or discrete.
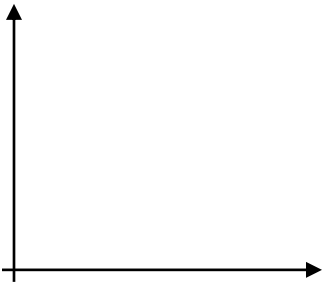
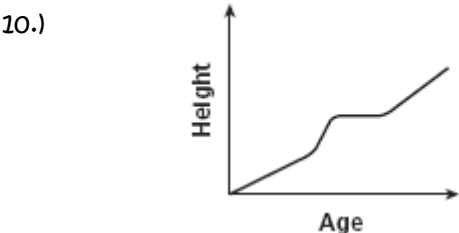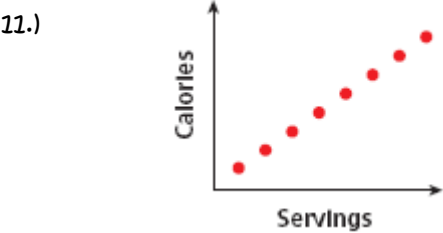8.) For six months, a puppy gained weight at a steady rate. Sketch a graph to illustrate the weight of the puppy during that time period. Tell whether the graph is continuous or discrete.

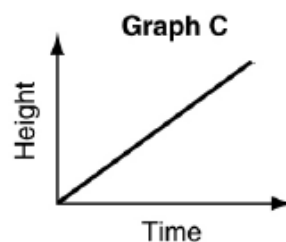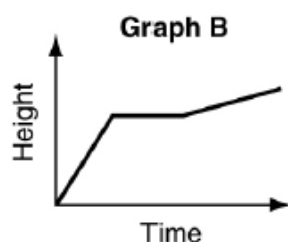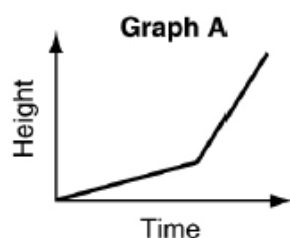**Write a possible situation for each graph.**

9.)

Speed / Time

10.)

Height / Age

11.)

Calories / Servings

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

LESSON 4-1

Practice B

Graphing Relationships

Choose the graph that best represents each situation.

Graph A

Height / Time

Graph B

Height / Time

Graph C

Height / Time

1. A tomato plant grows taller at a steady pace.   _____

2. A tomato plant grows quickly at first, remains
   a constant height during a dry spell, then grows
   at a steady pace.   _____

3. A tomato plant grows at a slow pace, then grows
   rapidly with more sun and water.   _____

4. Lora has $15 to spend on movie rentals
   for the week. Each rental costs $3.
   Sketch a graph to show how much
   money she might spend on movies in a
   week. Tell whether the graph is
   continuous or discrete.

   Movies

   Cost ($): 15 12 9 6 3
   Number of Rentals: 1 2 3 4 5

   _____

Write a possible situation for each graph.

5.

Weight / Age

_____

_____

_____

_____

6.

Weight: 60 50 40 30 20 10 0
Packages: 0 1 2 3 4 5 6

_____

_____

_____

_____
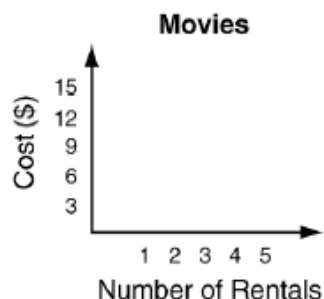
Problem Solving

Graphing Relationships

Sketch a graph for the given situation. Tell whether the graph is discrete or continuous.

1. A giraffe is born 6 feet tall and continues to grow at a steady rate until it is fully grown.

Height / Time

2. The price of a used car is discounted $200 each week.

Price / Weeks

4. Joseph is sky-diving. At first, he is free-falling rapidly and then he releases his parachute to slow his descent until he reaches the ground.

3. A city planner buys more buses as the population of her city grows.

Number of Buses / Population

Height Above Ground / Time
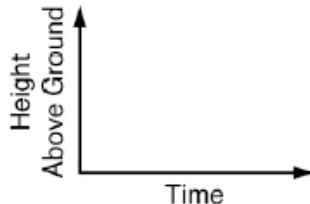
Choose the graph that best represents the situation.

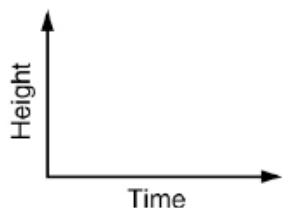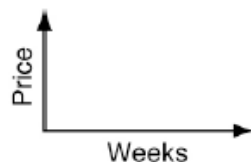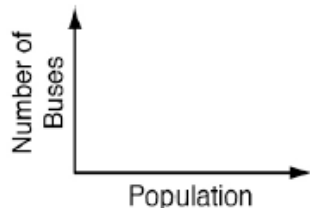5. Rebekah turns on the oven and sets it to 300 °F. She bakes a tray of cookies and then turns the oven off.

   A Graph 1   C Graph 3

   B Graph 2   D Graph 4

6. Leon puts ice cubes in his soup to cool it down before eating it.

   F Graph 1   H Graph 3

   G Graph 2   J Graph 4

7. Barlee has the flu and her temperature rises slowly until it reaches 101 °F.

   A Graph 1   C Graph 3

   B Graph 2   D Graph 4

8. On a hot day, Karin walks into and out of an air-conditioned building.

   F Graph 1   H Graph 3

   G Graph 2   J Graph 4

Graph 1

Temperature / Time

Graph 2

Temperature / Time

Graph 3

Temperature / Time

Graph 4

Temperature / Time
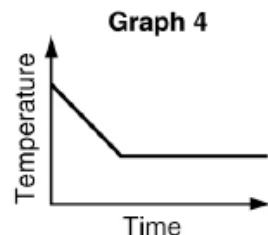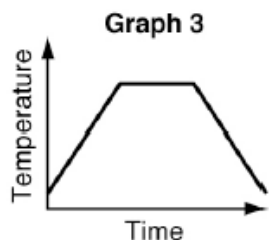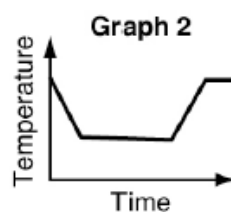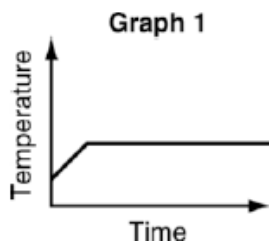
Review for Mastery

Graphing Relationships

Graphs are a way to turn words into pictures. Be sure to read the graphs from left to right.

increasing	**decreasing**	**stays the same**

Other descriptions:
rose
gained
grew

Other descriptions:
fell
lessened
diminished
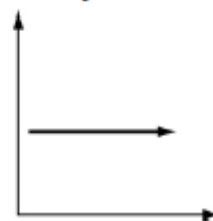
Other descriptions:
constant
steady
continuous

You can divide the graph into sections every time the graph changes directions. Then label each section.

Picture

Increasing

Same

Decreasing
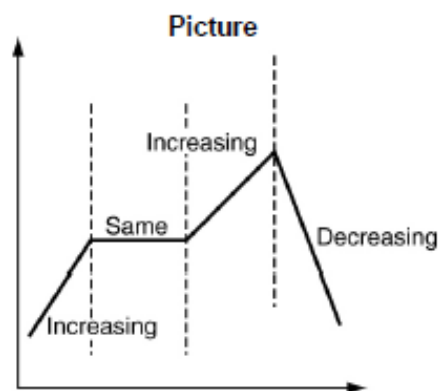
Increasing

Words

This graph increases, then stays constant, increases again, and finally decreases sharply.

Divide each graph into sections where the graph changes directions. Then label the sections as *increasing, decreasing,* or *same.*

1.

Graph A

Temperature

Time

2.

Graph B

Temperature

Time
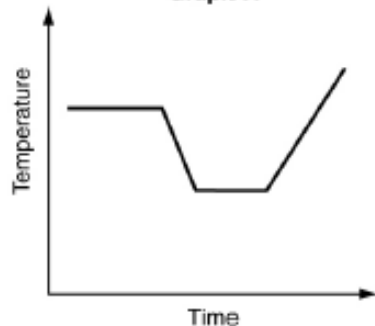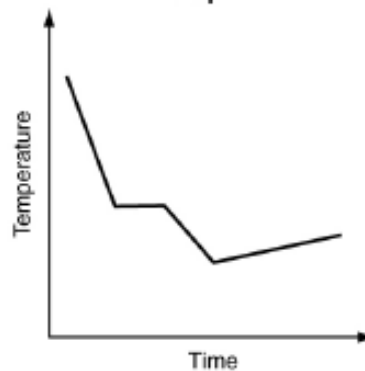
3. Which graph above shows that the air temperature fell steadily, leveled off, fell again, and then increased slightly?

_____

Review for Mastery

Graphing Relationships continued

A graph can be continuous or discrete. Continuous means the situation can include fractions or decimals. Discrete means the situation must have only specific amounts.

Continuous	Discrete
time	people
temperature	animals
distance	objects

Plant Growth

Height can include fractional amounts.

Remaining Animals to Adopt

Animals cannot be measured in fractional amounts. Points must be used.
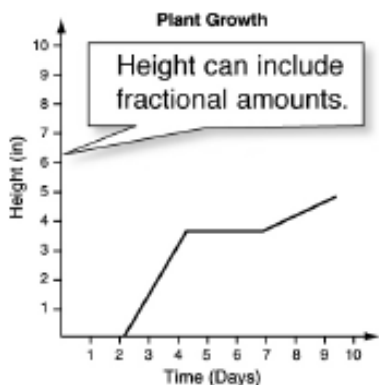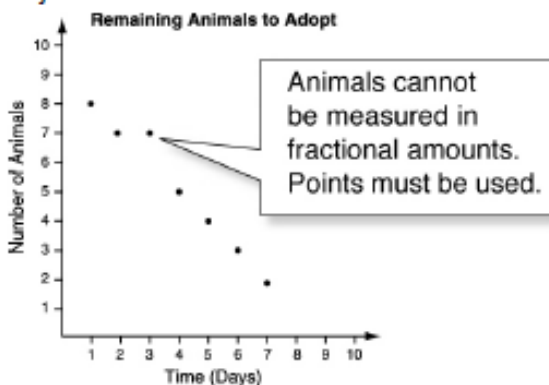
Sketch a graph of each situation. Tell whether the graph is continuous or discrete.

4. The heart rate of someone walking, then running, then resting.

Heart Rate

_____
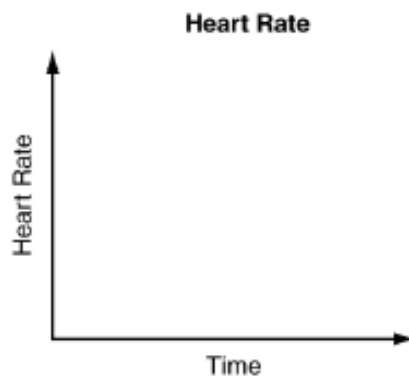
5. Ivy is selling ice cream. Each ice cream costs $1.50. She has 6 ice creams to sell.

Ivy's Earnings

_____

~ Section 4.2 Notes ~
Relations & Functions

TLW identify functions

TLW find the domain and range of relations and functions

TLW define relation, function, domain and range

Quick Draw Review

Generate ordered pairs for the function $y = x + 3$ for $x = -2, -1, 0, 1,$ and 2
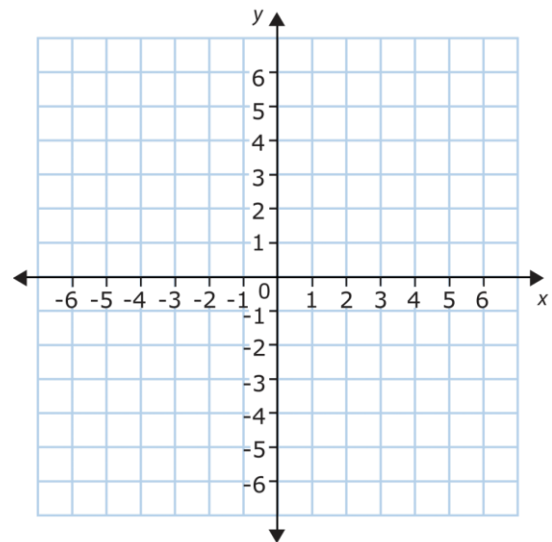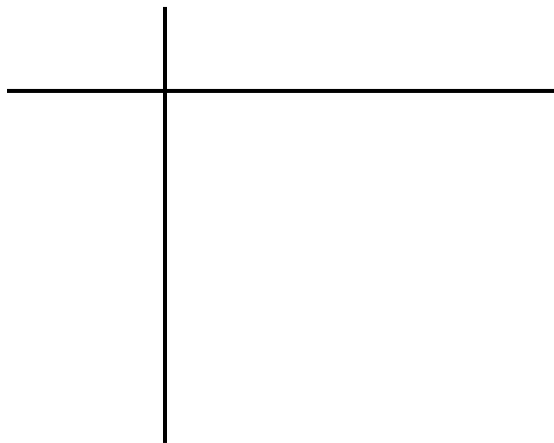
In Lesson 4-1 you saw relationships represented by graphs. Relationships can also be represented by a set of ordered pairs called a _____.

For example:
In the scoring systems of some track meets, for first place you get 5 points, for second place you get 3 points, for third place you get 2 points, and for fourth place you get 1 point.

This scoring system is a relation, so it can be shown by ordered pairs:

$\{(\quad,\quad),(\quad,\quad),(\quad,\quad),(\quad,\quad)\}$

Showing Multiple Representations of Relations

Example 1 – All Written Out Just for You!

Express the relation for the track meet scoring system, $\{(1,5),(2,3),(3,2),(4,1)\}$

Table

Track Scoring

Place	Points
1	5
2	3
3	2
4	1

Write all x-values under "Place" and all y-values under "Points."

Graph

Track Scoring
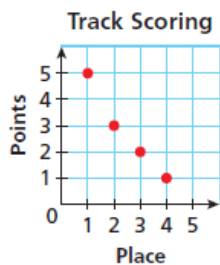
Use the x- and y-values to plot the ordered pairs.

Mapping Diagram

Place   Points

1	→ 5
2	→ 3
3	→ 2
4	→ 1
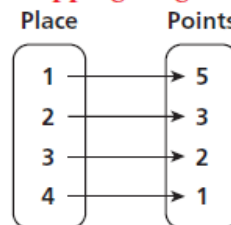
Write all x-values under "Place" and all y-values under "Points." Draw an arrow from each x-value to its corresponding y-value.

Example 2 – Now You Try!

Express the relation $\{(2,3),(4,6),(1,4),(3,2)\}$ as a table, as a graph, and as a mapping diagram.

x	y
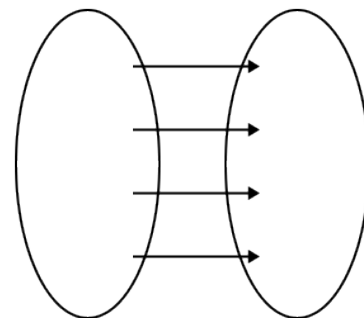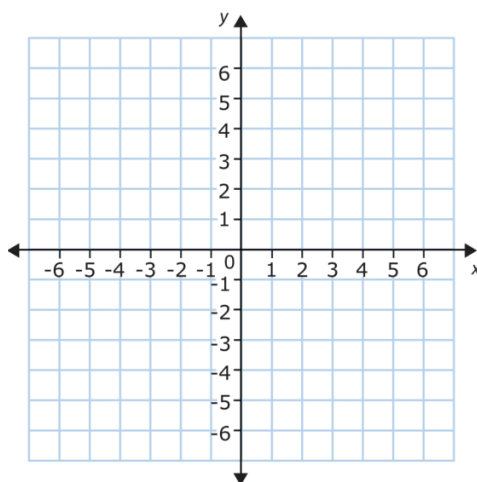
The _____ of a relation is the set of first coordinates (or x-values) of the ordered pairs.
The _____ of a relation is the set of second coordinates (or y-values) of the ordered pairs.

The domain of the track meet scoring system is {   }

The range is {   }

12

For each of the examples state the domain and range of the relations.

1.
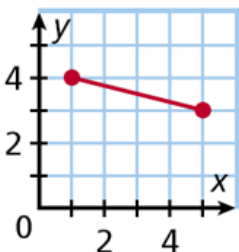
Domain: _____

Range: _____

2.
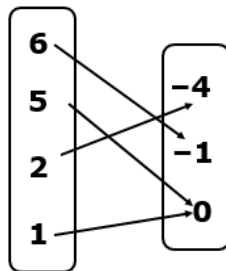
Domain: _____

Range: _____

3.

x	y
1	1
4	4
8	1

Domain: _____

Range: _____

A _____ is a special type of relation that pairs each domain value with exactly one range value.

Function or Relation – You Tell Me!

Example 1
Give the domain and range of the relation. Tell whether the relation is a function. Explain.

$\{(3,-2),(5,-1),(4,0),(3,1)\}$

Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

Example 2
Give the domain and range of the relation. Tell whether the relation is a function. Explain.

Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

13
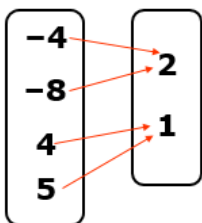
Guided Practice

Give the domain and range of each relation. Tell whether the relation is a function and explain.

1. $\{(-1,1),(-3,3),(5,-5),(-7,7)\}$

Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

2. $\{(-5,7),(0,0),(2,-8),(5,-20)\}$

Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

3.

x	3	5	2	8	6
y	9	25	4	81	36

Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

4.

x	−2	−1	0	1	2
y	1	1	1	1	1

Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

5.
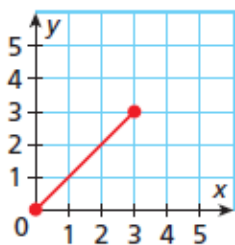
Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

6.

Yes, It's a Function   /   No, It's Not a Function

Domain: _____

Range: _____

14
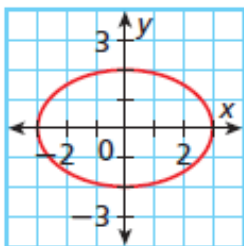
Practice B
Relations and Functions

Express each relation as a table, as a graph, and as a mapping diagram.

1. {(−5, 3), (−2, 1), (1, −1), (4, −3)}

x	y
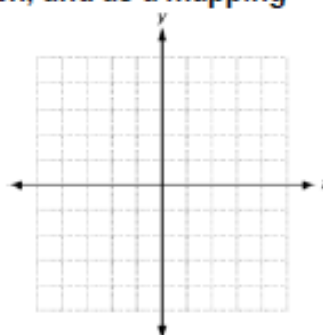
2. {(4, 0) (4, 1), (4, 2), (4, 3), (4, 4), (4, 5)}

x	y
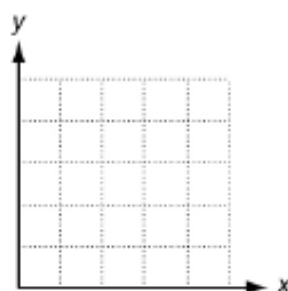
Give the domain and range of each relation. Tell whether the relation is a function. Explain.

3.

x	y
8	8
6	6
4	4
2	6
0	8

-3 → 12
-2 → 13
-1 → 14
0 → 15

D: _____

R: _____
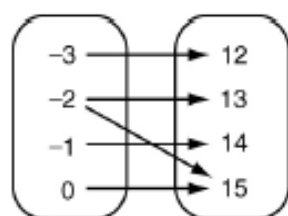
Function? _____

Explain: _____

_____

_____

4.

D: _____

R: _____
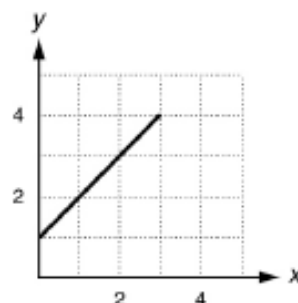
Function? _____

Explain: _____

_____

_____

5.

D: _____

R: _____

Function? _____

Explain: _____

_____

_____

Practice C

Relations and Functions

Express each relation as a table, as a graph, and as a mapping diagram.

1. {(−3, 5), (−2, 4), (−1, 1), (−1, −3)}

x	y
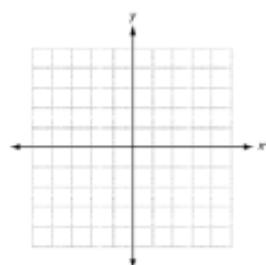
2. {(−2, 0), (−2, 1), (−2, 2), (−2, 3), (−2, 4), (−2, 5)}

x	y
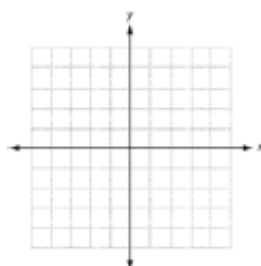
Give the domain and range of each relation. Tell whether the relation is a function. Explain.

3.

4.
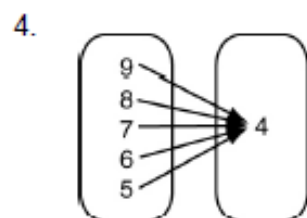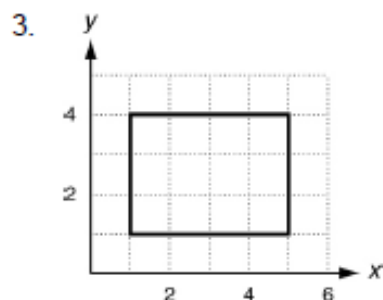
5.

x	y
1	1
2	2
3	3
4	4
5	5

D: _____

R: _____

Function? _____

Explain: _____

_____

_____

D: _____

R: _____

Function? _____

Explain: _____

_____

_____

D: _____

R: _____

Function? _____

Explain: _____

_____

_____

Problem Solving

Relations and Functions

Give the domain and range of each relation and tell whether it is a function.

1. The mapping diagram shows the ages x and grade level y of four children.

_____

_____
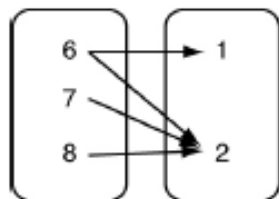
2.

Age x	Shoe Size y
6	8
9	10
12	10
15	10.5
18	11

_____

_____

3. The list represents the number of cars sold and the bonus received by the salespeople of a car dealership.

   {(1, 50), (2, 50), (3, 100), (4, 150)}

_____

_____

_____

4. A 2-inch-tall plant grows at a rate of 2.5 inches every week for 5 weeks. Let x represent the number of weeks and y represent the height of the plant.

_____

_____

_____

Use the graph below to answer questions 5–6. A conservation group has been working to increase the population of a herd of Asian elephants. The graph shows the results of their efforts. Select the correct answer.

5. Which relation represents the information in the graph?

   A {(1, 4.5), (2, 6), (3, 10), (4, 14.5)}

   B {(1, 5), (2, 6), (3, 10), (4, 15)}

   C {(4.5, 1), (6, 2), (10, 3), (14.5, 4)}

   D {(5, 1), (6, 2), (10, 3), (15, 4)}

6. What is the range of the relation shown in the graph?

   F {0, 1, 2, 3, 4, 5}

   G {1, 2, 3, 4}

   H {4.5, 6, 10, 14.5}

   J {5, 6, 10, 15}

Elephant Population
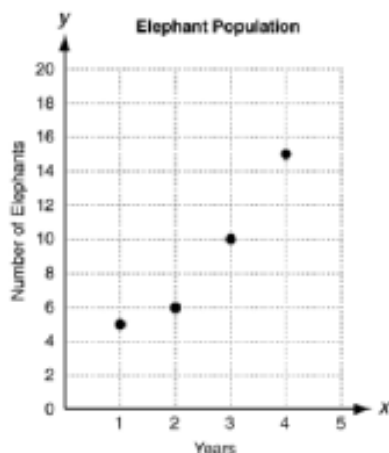
Review for Mastery
Relations and Functions

A relation is a set of ordered pairs. The relation can be in the form of a table, graph, or mapping diagram. The **domain** is all the *x*-values. The **range** is all the *y*-values.

Find the domain and range.

x	3	4	5	6
y	1	2	2	3

Do not list 2 twice in the range.

D: {3, 4, 5, 6}; R: {1, 2, 3}

Find the domain and range.
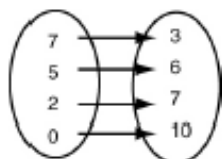
D: {7, 5, 2, 0}; R: {3, 6, 7, 10}

Find the domain and range.

range: from 3 to 5

domain: from 2 to 7
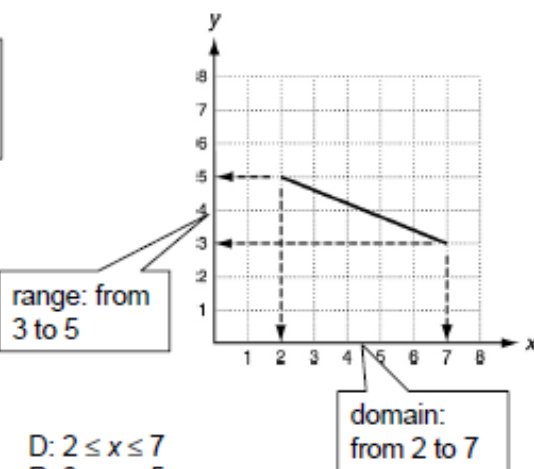
D: $2 \le x \le 7$
R: $3 \le y \le 5$

Find the domain and range of each relation.

1.

x	−2	−1	0	1
y	4	1	0	4

_____

2. (4, 5) (−2, 6) (−5, 12)

_____

3.

_____

4.

_____

5.

_____

6.

_____

A **function** is a type of relation where each *x* value (domain) can be paired with only one *y* value (range).

Functions

x	2	3	4	5
y	3	4	4	6

6 is paired with 2 and 3.
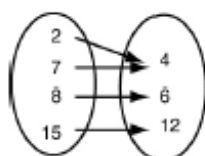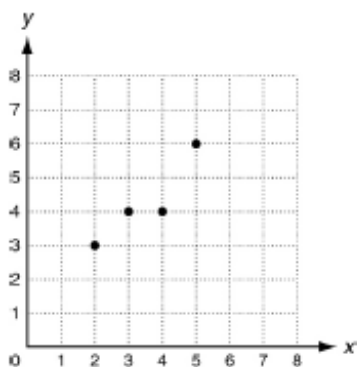
Not functions

x	5	6	6	7
y	1	2	3	4
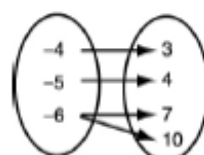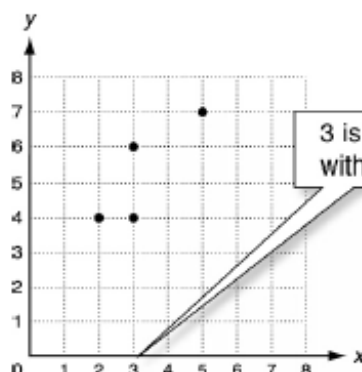
3 is paired with 4 and 6.

−6 is paired with 7 and 10.

Tell whether the relation is a function. Explain.

7.

x	−2	−3	−3	−4
y	1	2	3	4

_____

_____

8.

_____

_____
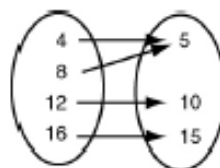
9.

_____

_____
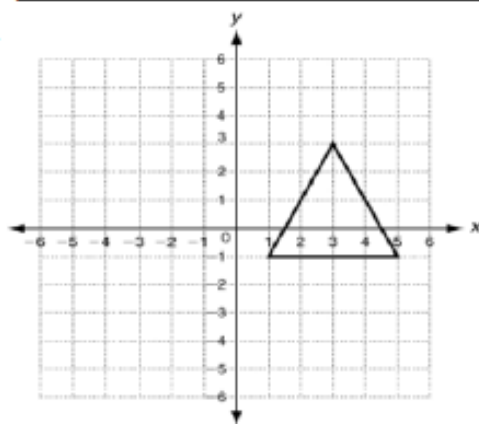
~ Section 4.3 Notes ~
Writing Functions

TLW identify independent and dependent variables

TLW write an equation in function notation and evaluate a function given input values

TLW define new vocabulary words such as: independent variable, dependent variable, function rule and function notation

Functions are Okay

Quick Draw Review
Evaluate each expression for $a = 2, b = -3$ and $c = 8$.

1. $a + 3c$

2. $ab - c$

3. $\dfrac{1}{2}c + b$

4. $b^a + c$

Using a Table to Write a Function

Example 1 – All Done For You!

Determine a relationship between the $x-values$ and $y-values$. Write an equation.

x	5	10	15	20
y	1	2	3	4

Step 1 List possible relationships between the first x and y-values.

$$5 - 4 = 1 \text{ and } 5\left(\frac{1}{5}\right) = 1$$

Step 2 Determine which relationship works for the other x- and y- values.

$$10 - 4 \neq 2 \qquad \text{and} \qquad 10\left(\frac{1}{5}\right) = 2$$

$$15 - 4 \neq 3 \qquad \text{and} \qquad 15\left(\frac{1}{5}\right) = 3$$

$$20 - 4 \neq 4 \qquad \text{and} \qquad 20\left(\frac{1}{5}\right) = 4$$

The value of y is one-fifth, $\left(\frac{1}{5}\right)$, of x.

Step 3 Write an equation.
$$y = \frac{1}{5}x \text{ or } y = \frac{x}{5}$$ *The value of y is one-fifth of x.*

<u>Example 2</u> – Let's Do This One Together

Determine a relationship between the $x-values$ and $y-values$. Write an equation.

$\{(1,3),(2,6),(3,9),(4,12)\}$

x				
y				

<u>Example 3</u> – You Try!

Determine a relationship between the $x-values$ and $y-values$. Write an equation.

$\{(1,-2),(2,-1),(3,0),(4,1)\}$

x				
y				

Independent & Dependent Variables

The input of a function is the _____.
The output of a function is the_____.
The value of the dependent variable *depends* on, or is a function of, the value of the independent variable.

<u>Example 1</u> – All Worked Out for You
Identify the independent and dependent variable in the situation.

A painter must measure a room before deciding how much paint to buy.

The amount of paint *depends on* the measurement of a room.

Dependent: amount of paint
Independent: measurement of the room

21

<u>Example 2</u> – Let's Do This One Together
Identify the independent and dependent variable in the situation.

In the winter, more electricity is used when the temperature goes down and less is used when the temperature rises.

Dependent:

Independent:

<u>Example 3</u> – You Try!
Identify the independent and dependent variable in the situation.

The cost of shipping a package is based on its weight.

Dependent:

Independent:

Try a couple more…
Identify the independent and dependent variable in the situation.

(a) A veterinarian must weigh an animal before determining the amount of medication.

Dependent: Independent:

(b) A company charges $10 per hour to rent a jackhammer.

Dependent: Independent:

(c) The height of a candle decreases 1 cm for every hour it burns.

Dependent: Independent:

An algebraic expression that defines a function is a **function rule**.

If x is the independent variable and y is the dependent variable, then **function notation** for y is $f(x)$ read "f of x," where f names the function. When an equation in two variables describes a function, you can use function notation to write it.

The dependent variable is a function of the independent variable.

y	is	a function of	x.
y	$=$	f	(x)

Writing Functions

Example 1 – All Worked Out for You!
Identify the independent and dependent variables. Write a rule in function notation for the situation.

A math tutor charges $35 per hour.

The amount a math tutor charges depends on number of hours.

Dependent: charges
Independent: hours

Let h represent the number of hours of tutoring.

The function for the amount a math tutor charges is $f(h) = 35h$.

Example 2 – Let's Try This One Together
Identify the independent and dependent variables. Write a rule in function notation for the situation.

A fitness center charges a $100 initiation fee plus $40 per month.

The _____ depends on the _____, plus $100.

Dependent: Independent:

Let m represent the number of months

The function for the amount the fitness center charges is $f(m)$

Example 3 – You Try!
Identify the independent and dependent variables. Write a rule in function notation for the situation.

Steven buys lettuce that costs $1.69/lb.

Example 4 – You Try Again!
Identify the independent and dependent variables. Write a rule in function notation for the situation.

An amusement park charges a $6.00 *parking fee plus* $29.99 *per person.*

Helpful Hint

There are several different ways to describe the variables of a function.

Independent Variable	Dependent Variable
x-values	y-values
Domain	Range
Input	Output
x	$f(x)$

You can think of a function as an input-output machine.

input
x 2
6
function
$f(x)=5x$
$5x$
10
30
output
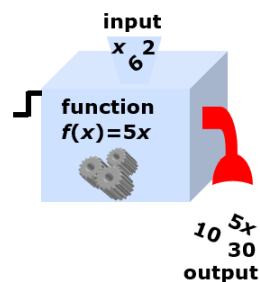
Evaluating Functions

Example 1 – All Done for You!
Evaluate the function for the given input values.

For $f(x) = 3x + 2$, find $f(x)$ when $x = 7$ and when $x = -4$.

$f(x) = 3(x) + 2$

$f(7) = 3(7) + 2$ *Substitute 7 for x.*

$= 21 + 2$ *Simplify.*

$= 23$

$f(x) = 3(x) + 2$

$f(-4) = 3(-4) + 2$ *Substitute -4 for x.*

$= -12 + 2$ *Simplify.*

$= -10$

<u>Example 2 – Let's Try This One Together!</u>
Evaluate the function for the given input values.

Given: $g(t) = 1.5t - 5$ Find: $g(t)$ when $t = 6$ and when $t = -2$

<u>Example 3 – You Try!</u>

(a) Given: $g(t) = \frac{1}{4}t + 1$ Find: $g(t)$ when $t = -24$ and when $t = 400$

(b) Given: $h(r) = \frac{1}{3}r + 2$ Find: $h(r)$ when $r = 600$ and when $r = -12$

When a function describes a real-world situation, every real number is not always reasonable for the domain and range. For example, a number representing the length of an object cannot be negative, and only whole numbers can represent a number of people.

<center>Finding the Reasonable Range and Domain of a Function</center>

<u>Example 1</u>
Write a function to describe the situation. Find a reasonable domain and range of the function.
Joe has enough money to buy 1, 2, or 3 DVDs at $15.00 each.

Money spent	is	$15.00	for each	DVD.
f(x)	=	$15.00	•	x

If Joe buys x DVDs, he will spend $f(x) =$

So, Joe only has enough money to purchase _____.

Therefore a reasonable domain would be: {   }

Substitute the domain values into the function rule to find the range values.

x	1	2	3
f(x)			

So a reasonable range would be: {   }

Example 2
Write a function to describe the situation. Find a reasonable domain and range of the function.

The settings on a space heater are the whole numbers from 0 to 3. The total of watts used for each setting is 500 times the setting number. Write a function rule to describe the number of watts used for each setting. Find a reasonable domain and range for the function.

Number of   is   500   times   the setting #.
watts used   watts

$f(x) =$

For each setting, the number of watts is $f(x) =$

There are 4 possible settings _____ so a reasonable domain would be: {   }

x	0	1	2	3
f(x)				

So, a reasonable range for this situation is {   }

Practice B
Writing Functions

Determine a relationship between the *x*- and *y*-values. Write an equation.

1.

x	−4	−3	−2	−1
y	−1	0	1	2

2. {(2, 3), (3, 5), (4, 7), (5, 9)}

_____   _____

Identify the independent and dependent variables in each situation.

3. Ice cream sales increase when the temperature rises.

   I: _____

   D: _____

4. Food for the catered party costs $12.75 per person.

   I: _____

   D: _____

Identify the independent and dependent variables. Write a rule in function notation for each situation.

5. Carson charges $7 per hour for yard work.

_____

_____

_____

6. Kay donates twice what Ed donates.

_____

_____

_____

Evaluate each function for the given input values.

7. For $f(x) = 5x + 1$, find $f(x)$ when $x = 2$ and when $x = 3$. _____ _____

8. For $g(x) = -4x$, find $g(x)$ when $x = -6$ and when $x = 2$. _____ _____

9. For $h(x) = x - 3$, find $h(x)$ when $x = 3$ and when $x = 1$. _____ _____

Complete the following.

10. An aerobics class is being offered once a week for 6 weeks. The registration fee is $15 and the cost for each class attended is $10. Write a function rule to describe the total cost of the class. Find a reasonable domain and range for the function.

_____

_____

_____

Practice C
Writing Functions

Determine a relationship between the *x*- and *y*-values. Write an equation.

1.

x	-2	-1	0	1
y	4	1	0	1

_____

2. {(−1, −4), (0, −2), (2, 2), (5, 8)}

_____

Identify the independent and dependent variables in each situation.

3. More program money is given out to cities with a larger population.

I: _____

D: _____

4. Sales tax in the state of Maryland is 5% of the purchase price.

I: _____

D: _____

Identify the independent and dependent variables. Write a rule in function notation for each situation.

5. Meg earns a $5 flat fee plus $4.50 per student for a tutoring session.

_____

_____

_____

6. Jeb is allowed 2 hours less television time per week than his older brother.

_____

_____

_____

Evaluate each function for the given input values.

7. For $f(x) = 3x + 2$, find $f(x)$ when $x = 4$ and when $x = -1$. _____ _____

8. For $g(x) = -6x$, find $g(x)$ when $x = -5$ and when $x = 3$. _____ _____

9. For $h(x) = x^2 - 4$, find $h(x)$ when $x = 2$ and when $x = -7$. _____ _____

Complete the following.

10. A fitness class is being offered twice a week for four weeks. The registration fee is $8.50 and the cost for each class attended is $4.75. Write a function rule to describe the total cost of the class. Find a reasonable domain and range for the function.

_____

_____

_____

Review for Mastery

Writing Functions

Functions have dependent and independent variables. The dependent variable will always depend on the independent variable.

Rewrite each situation using the word *depends*. Then identify the dependent and the independent variables.

An employee who works longer hours will receive a larger amount in her paycheck.

Rewrite sentence:

> The **amount of a paycheck** *depends* on the **number of hours worked.**
>
> Dependent: amount of paycheck   Independent: number of hours worked

A box with several books weighs more than a box with just a few books.

Rewrite sentence:

> The **weight of a box** *depends* on the **number of books in the box.**
>
> Dependent: weight of box   Independent: number of books in box

Rewrite each sentence using the word *depends*. Then identify the dependent and the independent variables.

1. A very large animal will eat many pounds of food.

   _____

   Dependent: _____

   Independent: _____

2. The fire was very large, so many firefighters were there.

   _____

   Dependent: _____

   Independent: _____

3. The temperature of the water on the heated stove rose each minute.

   _____

   Dependent: _____

   Independent: _____

4. The restaurant bill was low because only a few meals were ordered.

   _____

   Dependent: _____

   Independent: _____

Review for Mastery

After identifying the independent and dependent variables, you can write a rule in function notation. Remember that $f(x)$ is the dependent variable and x is the independent variable.

Identify the dependent and independent variables. Write a function rule for each situation.

A zoo charges $6 for parking and $17.50 for each child.

    1. *Identify the dependent and independent variables.*

    The cost of admission *depends* on the **number of children.**

    Dependent $f(x)$: cost of admission   Independent x: number of children

    2. *Write the equation in words.*

    The cost of admission is $17.50 multiplied by the number of children plus $6 for parking.

    3. *Write the function using cost of admission = $f(x)$ and number of children = x.*

$$f(x) = \$17.50x + \$6.00$$

Evaluate the function above when $x = 4$ and $x = 10$.

$x = 4$	$x = 10$
$f(x) = \$17.50x + \$6.00$	$f(x) = \$17.50x + \$6.00$
$f(4) = \$17.50(4) + \$6.00$	$f(10) = \$17.50(10) + \$6.00$
$\quad = \$70.00 + \$6.00$	$\quad = \$175.00 + \$6.00$
$\quad = \$76.00$	$\quad = \$181.00$

Identify the dependent and the independent variables for each situation below. Write the function. Then evaluate the function for the given input values.

5. A limo service charges $90 for each hour.

    Dependent $f(x)$: _____

    Independent x: _____

    Function: _____

    Evaluate for $x = 2$.

    _____

    Evaluate for $x = 7.5$.

    _____

6. A computer support company charges $295 for the first hour plus $95 for each additional hour.

    Dependent $f(x)$: _____

    Independent x: _____

    Function: _____

    Evaluate for $x = 3.25$.

    _____

    Evaluate for $x = 8$.

    _____

Problem Solving

Writing Functions

Identify the independent and dependent variables. Write a rule in function notation for each situation.

1. Each state receives electoral votes based on the number of representatives it has in the House of Representatives.

Representatives	2	4	6	8
Electoral Votes	4	6	8	10

_____

_____

_____

2. Terry has 30 pieces of gum and gives 2 pieces to each of his friends.

_____

_____

_____

3. Ronaldo is buying bacon that costs $4.29 per pound.

_____

_____

_____

4. A personal trainer charges $50 for the first session and $40 for every session thereafter.

_____

_____

_____

International travel and business require the conversion of American dollars into foreign currency. During part of 2005, one American dollar was worth 6 Croatian Kuna. Select the best answer.

5. An American bank wishes to convert d dollars into kuna. Which function rule describes the situation?

   A $f(d) = \dfrac{d}{6}$ C $f(d) = \dfrac{6}{d}$

   B $f(d) = 6d$ D $f(d) = d + 6$

7. Macon has $100 and is thinking about converting some of it into kuna. What is a reasonable range for this situation?

   A $0 \le y \le 6$ C $0 \le y \le 100$

   B $0 \le y \le 16.7$ D $0 \le y \le 600$

8. Robin converts x dollars into y kuna. Which expression is the independent variable in this situation?

   F x H $6x$

   G y J $6y$

6. A Croatian company already has $100,000 and is going to convert k kuna into dollars. Which function rule can be used to determine the total amount of American dollars this company will have?

   F $f(x) = 100,000 + 6k$

   G $f(x) = 100,000 + \dfrac{k}{6}$

   H $f(x) = 100,000k + 6$

   J $f(x) = 100,000 + \dfrac{6}{k}$

9. Jakov converts n kuna into c dollars. Which expression is the dependent variable in this situation?

   A n C $\dfrac{n}{6}$

   B c D $\dfrac{c}{6}$

~ Section 4.4 Notes ~
Graphing Functions

TLW graph functions given a limited domain

TLW graph functions given a domain of all real numbers

TLW graph functions using concepts learned in section 4.3 of evaluating functions at a given value

Quick Draw Review
In 1 – 3, solve each equation for y .

1. $2x + y = 3$

2. $-x + 3y = -6$

3. $4x - 2y = 8$

4. Generate ordered pairs for $y = \dfrac{1}{2}x + 1$ using $x = -4, -2, 0, 2,$ and 4

Scientists can use a function to make conclusions about the rising sea level.
Sea level is rising at an approximate rate of 2.5 millimeters per year. If this rate continues, the function $y = 2.5x$ can describe how many millimeters y sea level will rise in the next x years.
You can graph a function by finding ordered pairs that satisfy the function.

x	y

32
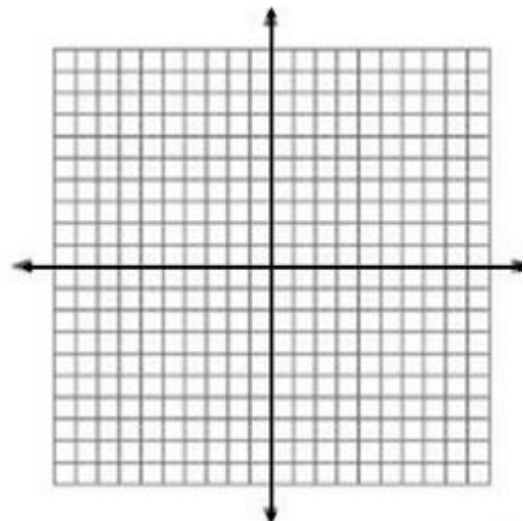
Graphing Functions Given a Domain

<u>Example 1</u> – All Done for You!

Graph the function for the given domain.
$x - 3y = -6$; D: {−3, 0, 3, 6}

Step 1 Solve for y since you are given values of the domain, or x.

$$x - 3y = -6$$
$$\underline{-x \qquad\qquad -x}$$ *Subtract x from both sides.*
$$-3y = -x - 6$$
$$\frac{-3y}{-3} = \frac{-x-6}{-3}$$ *Since y is multiplied by −3, divide both sides by −3.*
$$y = \frac{1}{3}x + 2$$ *Simplify.*

Step 2 Substitute the given value of the domain for x and find values of y.

x	$y = \frac{1}{3}x + 2$	(x, y)
−3	$\frac{1}{3}(-3) + 2 = 1$	(−3, 1)
0	$\frac{1}{3}(0) + 2 = 2$	(0, 2)
3	$\frac{1}{3}(3) + 2 = 2$	(3, 3)
6	$\frac{1}{3}(6) + 2 = 4$	(6, 4)

Step 3 Graph the ordered pairs.
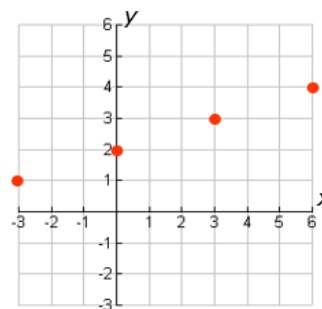
<u>Example 2</u> – Let's Try This One Together!
Graph the function for the given domain.

$$f(x) = x^2 - 3 ; \quad D:\{-2, -1, 0, 1, 2\}$$

Use the given values of the domain to find the values of $f(x)$

x	$f(x) = x^2 - 3$	$(x, f(x))$
−2		
−1		
0		
1		
2		

Graph the ordered pairs
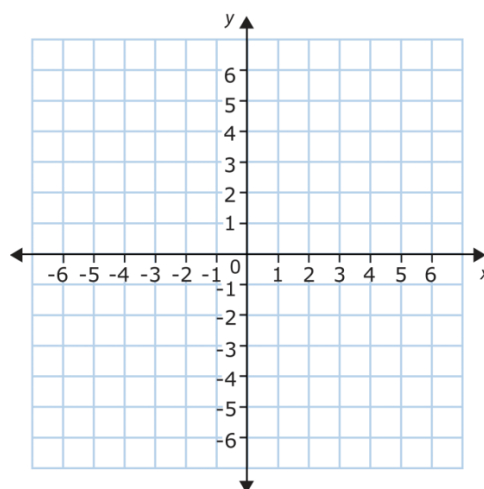
Example 3 – You Try!
Graph the function for the given domain.

$$-2x + y = 3 \qquad D:\{-5, -3,\ 1,\ 4\}$$

x	y = 2x + 3	(x, y)
−5		
−3		
1		
4		
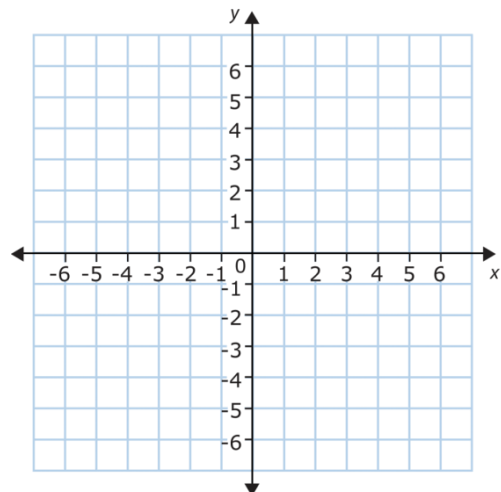
If the domain of a function is all real numbers, any number can be used as an input value. This process will produce an infinite number of ordered pairs that satisfy the function. Therefore, arrowheads are drawn at both "ends" of a smooth line or curve to represent the infinite number of ordered pairs. If a domain is not given, assume that the domain is all real numbers.

Graphing Functions Using a Domain of All Real Numbers	
Step 1	Use the function to generate ordered pairs by choosing several values for x.
Step 2	Plot enough points to see a pattern for the graph.
Step 3	Connect the points with a line or smooth curve.

Finding Values Using Graphs

Example 1 – All Done for You!

Use a graph of the function $f(x) = -\dfrac{1}{2}x + 4$ to find the value of $f(x)$ when $x = -4$.

Check your answer algebraically.

Locate −4 on the x-axis. Move up to the graph of the function. Then move right to the y-axis to find the corresponding value of y.

$f(-4) = 6$
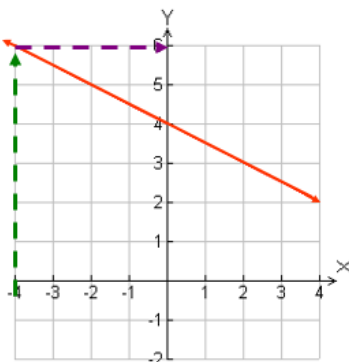
$f(-4) = 6$

Check Use substitution.

$$f(x) = -\frac{1}{2}x + 4$$

6	$-\frac{1}{2}(-4) + 4$
6	2 + 4
6	6 ✓

34

<u>Example 2</u> – Let's Try This One Together

Use a graph of the function $f(x) = \frac{1}{3}x + 2$ to find the value of $f(x)$ when $x = 3$.
Check your answer algebraically.
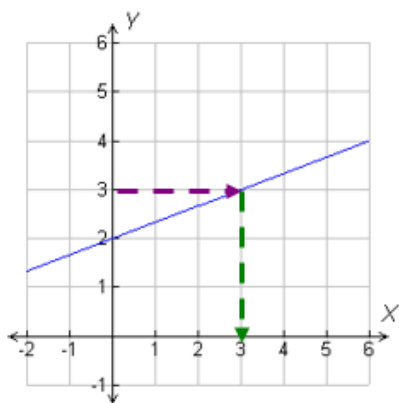
Recall that in real-world situations you may have to limit the domain to make answers reasonable. For example, quantities such as time, distance, and number of people can be represented using only nonnegative values. When both the domain and the range are limited to nonnegative values, the function is graphed only in Quadrant I.
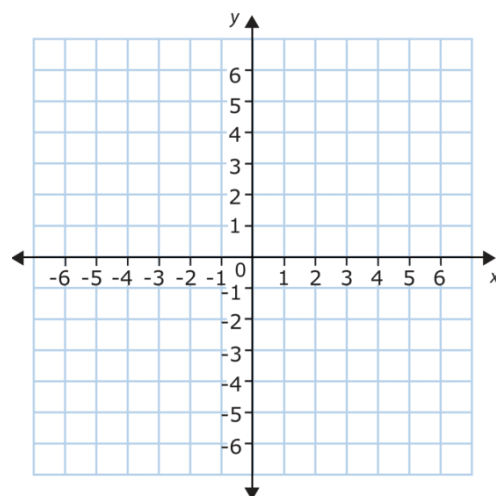
Problem Solving Applications

<u>Example 1</u> – Let's Try This Together

A mouse can run 3.5 meters per second. The function $y = 3.5x$ describes the distance in meters the mouse can run in x seconds. Graph the function. Use the graph to estimate how many meters a mouse can run in 2.5 seconds.

Choose several nonnegative values of x to find values of y.

x	y = 3.5x	(x, y)
0		
1		
2		
3		

So to answer the question, a mouse can run about _____ meters in 2.5 seconds.

Guided Practice

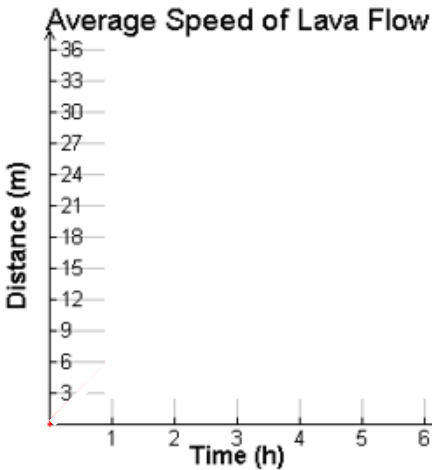1. Graph the function: $-3x + 2 = y$

X	−3x + 2 = y	(x, y)
−2		
−1		
0		
1		
2		
3		
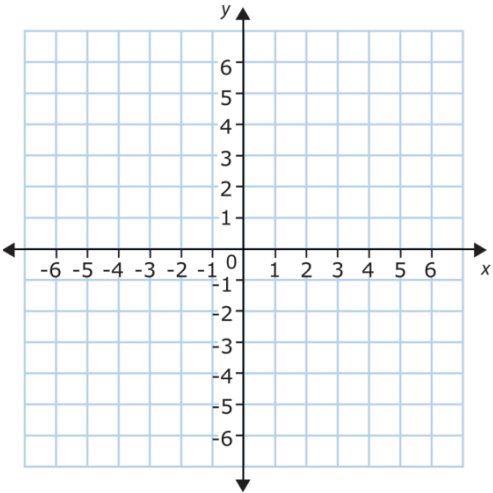
2. Graph the function: $y = |x - 1|$

X		(x, y)
−2		
−1		
0		
1		
2		
3		
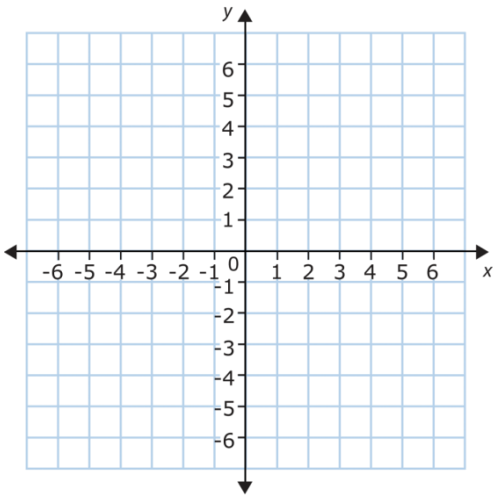
3. The fastest recorded Hawaiian lava flow moved at an average speed of 6 miles per hour. The function $y = 6x$ describes the distance y the lava moved on average in x hours. Graph the function. Use the graph to estimate how many miles the lava moved after 5.5 hours.

x	y = 6x	(x, y)
1		
3		
5		

The lava will travel about _____ meters in 5.5 seconds.

Average Speed of Lava Flow

Graph the function for the given domain.

1. $y = |x| - 1$; D: $\{-1, 0, 1, 2, 3\}$
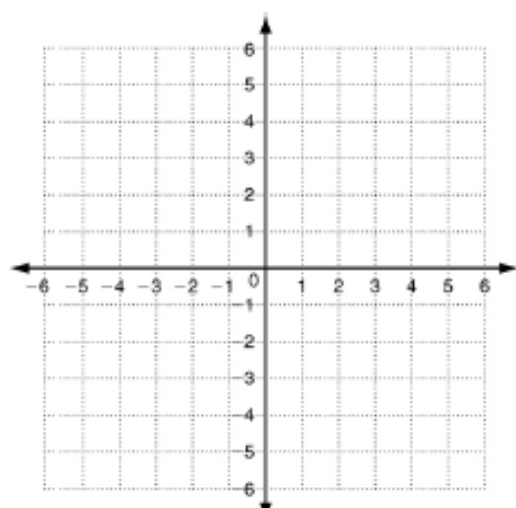
Graph the function.

2. $f(x) = x^2 - 3$
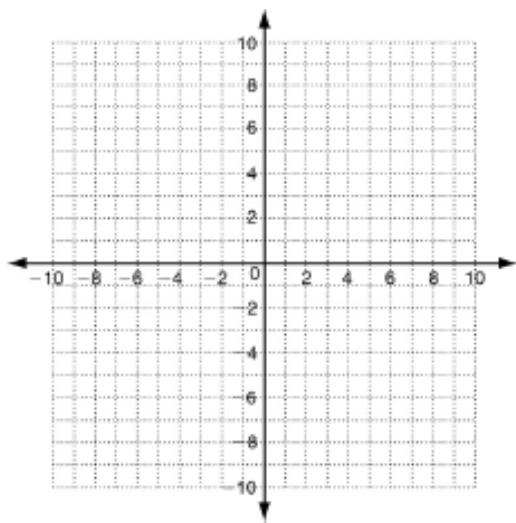
3. One of the slowest fish is the blenny fish. The function $y = 0.5x$ describes how many miles y the fish swims in x hours. Graph the function. Use the graph to estimate the number of miles the fish swims in 3.5 hours.
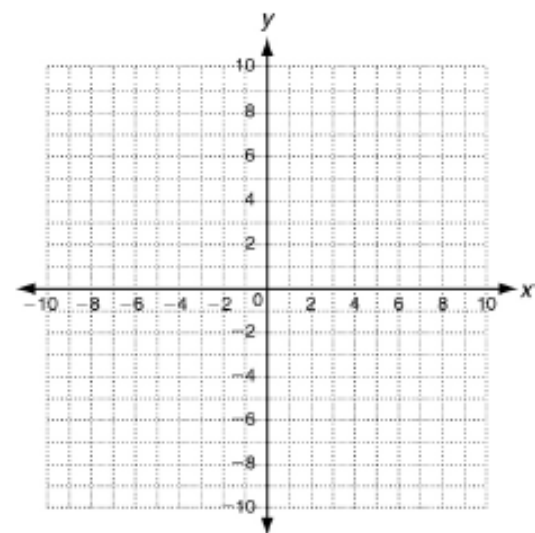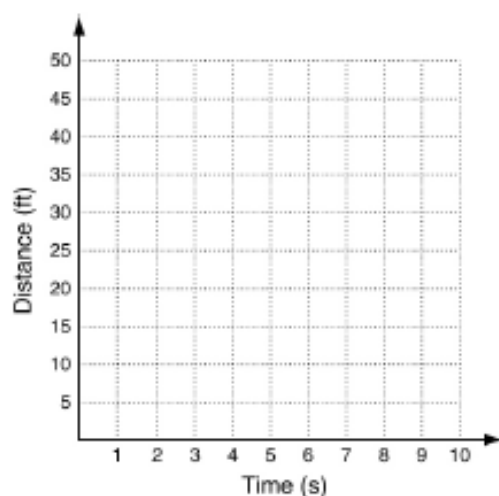
_____
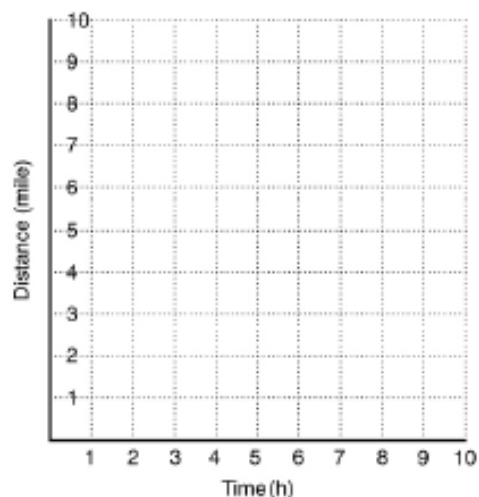
Practice C

Graphing Functions

1. Graph $y = |x - 2| + 3$ for the following domain:
   $\{-2, 0, 2, 4, 6\}$
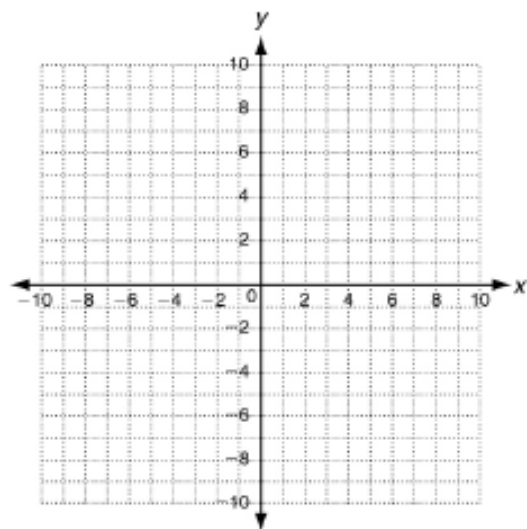
2. Graph $y = \left(\dfrac{x}{4}\right)^2 + 2$.

3. A human being can swim at a maximum rate of 7.4 feet per second. The function $y = 7.4x$ describes how many feet y a person can swim in x seconds. Graph the function. Use the graph to estimate the maximum number of feet a person can swim in 4.5 seconds.

_____

Problem Solving

Graphing Functions

In 1998, Hurricane Bonnie approached the United States at a speed of 8 miles per hour. The function $y = 8x$ describes how many miles y Hurricane Bonnie traveled in x hours.

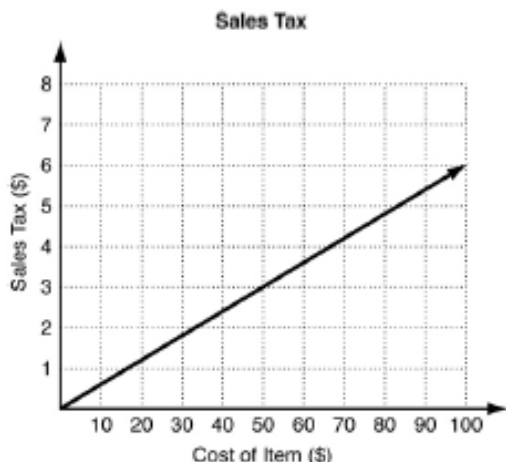1. Complete the table by generating ordered pairs.

x	$y = 8x$	(x, y)
0		
1		
2		
3		
4		

3. Use the graph to estimate how far Hurricane Bonnie traveled in 3.5 hours.

_____

2. Graph the function $y = 8x$.

Hurricane Bonnie
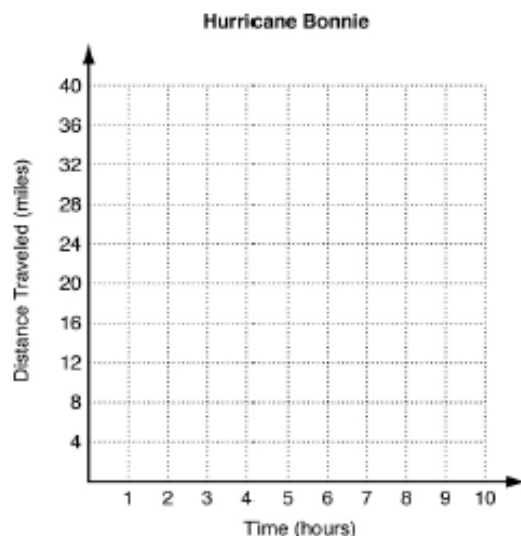
Select the correct answer.

4. The graph below shows the relation between the cost of an item and the sales tax due. Which function is graphed below?

Sales Tax

A $y = \dfrac{6}{x}$ C $y = \dfrac{x}{6}$

B $y = 0.06x$ D $y = 6x$

5. The graph below shows the relation between Jeremy's age and the number of times per year he refused to eat his brussel sprouts. Which function is graphed for the domain {1, 2, 3, 4, 5}?
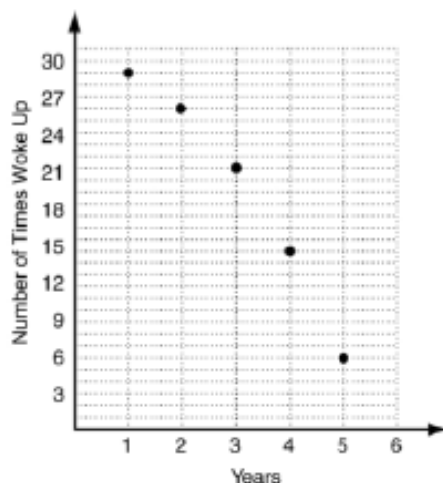
F $y = 30 - x$ H $y = 30 - x^2$

G $y = x + 28$ J $y = 29x$

~ Section 4.5 Notes ~
Scatter Plots and Trend Lines

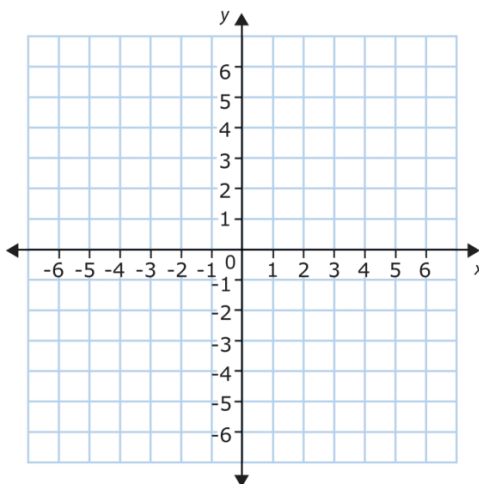TLW create and interpret scatter plots

TLW use trend lines to make predictions

TLW define new vocabulary words: scatter plot, correlation, positive correlation, negative correlation, no correlation, and trend line

Quick Draw Review
Graph each point:

A (3, 2)

B (-3, 3)

C (-2, -1)

D (0, -3)

E (1, 0)

F (3, -2)

Graphing a Scatter Plot from Given Data

Example 1 – All Done for You!

The table shows the number of cookies in a jar from the time since they were baked. Graph a scatter plot using the given data.

Cookies in the Jar				
Time Since Baked (d)	1	2	3	4
Cookies	24	16	10	7

Use the table to make ordered pairs for the scatter plot.

The x-value represents the time since the cookies were baked and the y-value represents the number of cookies left in the jar.

Plot the ordered pairs.

Displaying data visually can help you see relationships.

A _____
is a graph with points plotted to show a possible relationship between two sets of data.

A scatter plot is an effective way to some types of data.

40

Example 2 – Let's Try this one Together!

The table shows the number of points scored by a high school football team in the first four games of a season. Graph a scatter plot using the given data.

| Game	1	2	3	4
Score	6	21	46	34

Football Team Scores
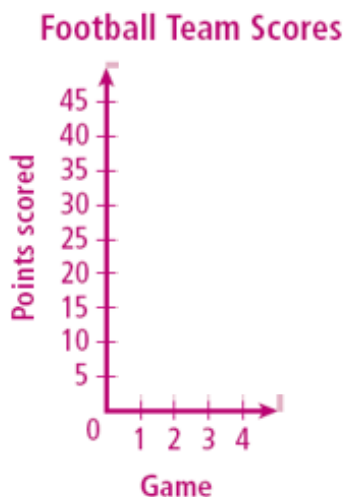
Example 3 – You Try!

The table shows the number of species added to the list of endangered and threatened species in the United States during the given years. Graph a scatter plot using the given data.

Increase in List							
Calendar Year	1996	1997	1998	1999	2000	2001	2002
Species	91	79	62	11	39	10	9

Source: U.S. Fish and Wildlife Service

Species Added to List
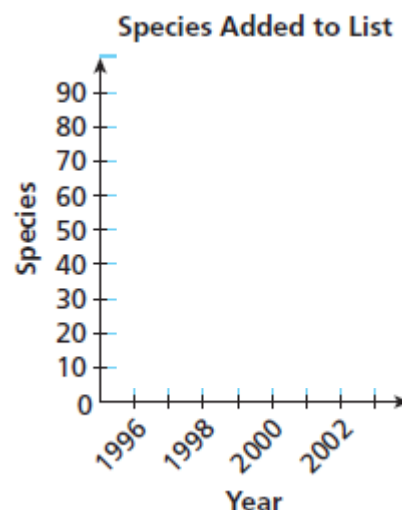
A _____ describes a relationship between two data sets.

A graph may show the correlation between data. The correlation can help you analyze trends and make predictions.

There are three types of correlations between data.
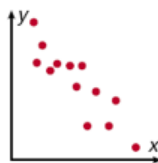
Correlations

Positive Correlation
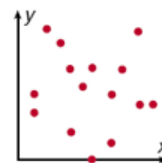Both sets of data values increase.
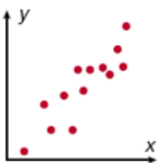
Negative Correlation
One set of data values increases as the other set decreases.

No Correlation
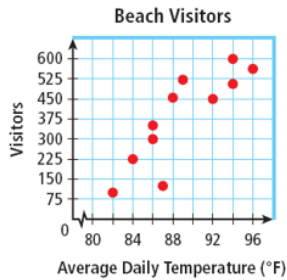There is no relationship between the data sets.

Example 1 – All Done for You!

Describe the correlation illustrated by the scatter plot.

As the average daily temperature increased, the number of visitor increased.

There is a positive correlation between the two data sets.

Beach Visitors

COOL STORY BRO

NOW, GIVE ME COOKIE.

Example 2 – Let's Try this One Together!

Describe the correlation illustrated by the scatter plot.

As the years passed _____
in the snowboarding competition _____.

There is a _____ correlation between
the two sets of data.

Snowboarding Competition

Example 3 – You Try!

Describe the correlation illustrated by the scatter plot.

As _____
_____.

There is a _____ correlation between
the two sets of data.

TV Watching and Test Scores
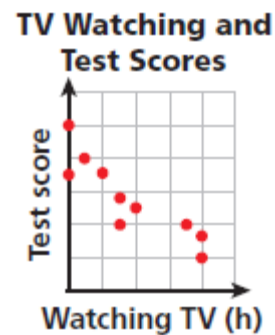
Identifying Correlations

Example 1 – All Done for You!

Identify the correlation you would expect to see between the pair of data sets. Explain.

the number of people in an audience and ticket sales

You would expect to see a positive correlation. As the number of people in the audience increases, ticket sales increase.

Example 2 – Let's Try this One Together

Identify the correlation you would expect to see between the pair of data sets. Explain.

the number of people in an audience and ticket sales

You would expect to see a _____.

As the number of people in the audience _____, ticket sales _____.

Examples 3 & 4 – You Try!

Identify the correlation you would expect to see between the pair of data sets. Explain.

a runner's time and the distance to the finish line

You would expect to see a _____.

As a runner's time _____, the distance to the finish line _____.

the temperature in Houston and the number of cars sold in Boston
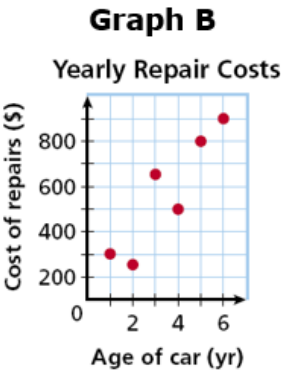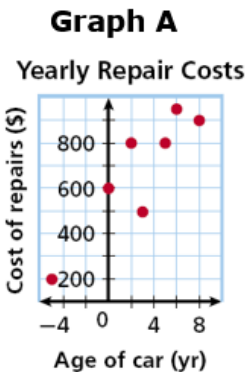
You would expect to see a _____.

The temperature in Houston _____ the number of cars sold in Boston.

Matching Scatter Plots to Situations

Choose the scatter plot that best represents
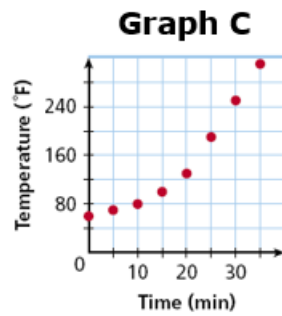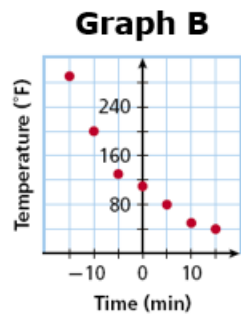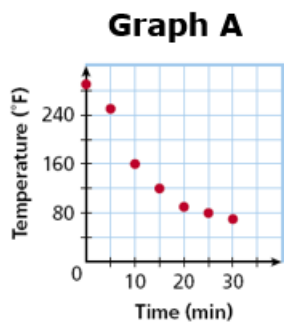the relationship between the age of a car and the amount of money spent each year on repairs
Explain.

Graph A — Yearly Repair Costs (Cost of repairs ($) vs Age of car (yr))
Graph B — Yearly Repair Costs (Cost of repairs ($) vs Age of car (yr))
Graph C — Yearly Repair Costs (Cost of repairs ($) vs Age of car (yr))

_____

_____

_____

_____

_____

_____
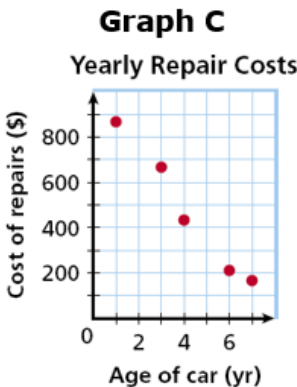
Choose the scatter plot that best represents

the relationship between the number of minutes since a pie has been taken

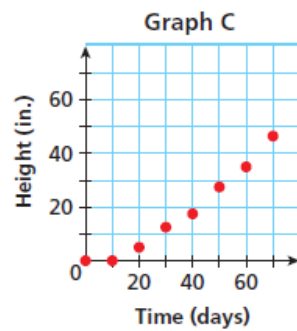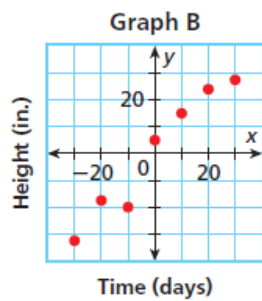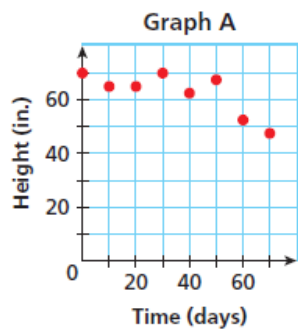out of the oven and the temperature of the pie

Explain.

Graph A

Temperature (°F) vs Time (min)

Graph B

Temperature (°F) vs Time (min)

Graph C

Temperature (°F) vs Time (min)

_____

_____

_____

_____

_____

_____

_____

Choose the scatter plot that best represents

the relationship between the number of days since a sunflower seed

was planted and the height of the plant

Explain.

Graph A

Height (in.) vs Time (days)

Graph B

Height (in.) vs Time (days)

Graph C

Height (in.) vs Time (days)

_____

_____

_____

_____

_____

_____

_____

You can graph a function on a scatter plot to help show a relationship in the data. Sometimes the function is a straight line. This line, called a _____, helps show the correlation between data sets more clearly. It can also be helpful when making predictions based on the data.

Application Examples- Trend Lines

Example 1 – Let's Try this One Together
The scatter plot shows a relationship between the total amount of money collected at the concession stand and the total number of tickets sold at a movie theater. Based on this relationship, predict how much money will be collected at the concession stand when 150 tickets have been sold.

Draw a trend line and use it to make a prediction.


Concession Stand Sales
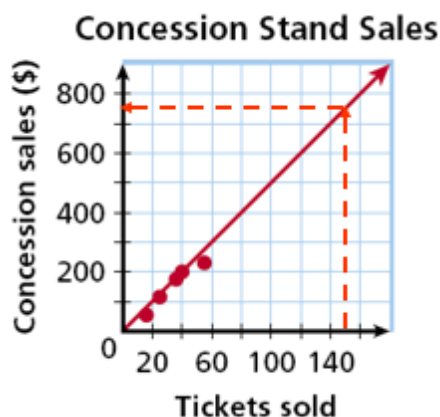
Based on the data, _____ is a reasonable prediction of how much money will be collected when 150 tickets have been sold.
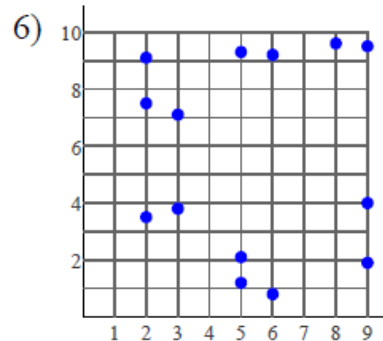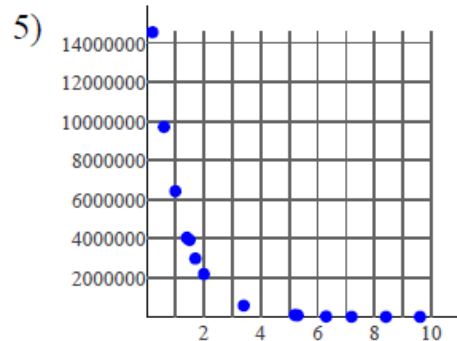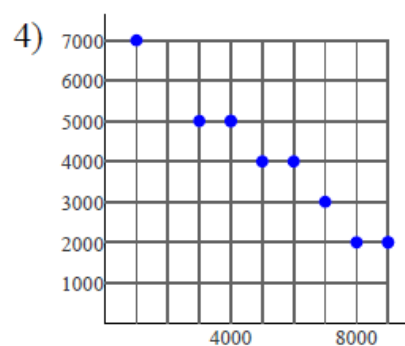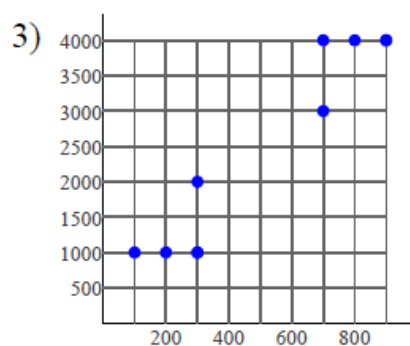
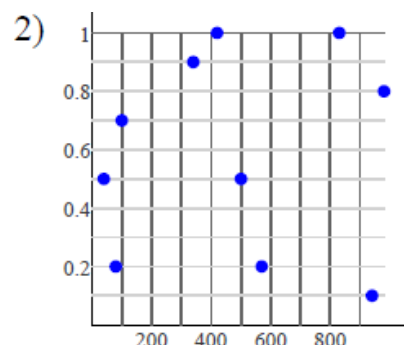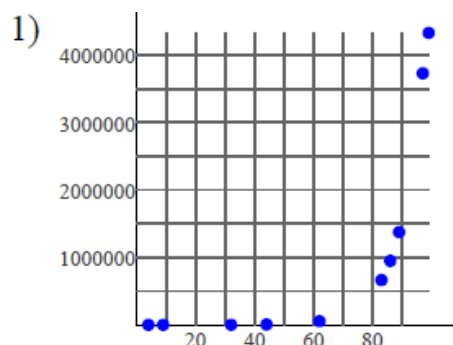### Example 2 – You Try!

Based on the trend line, predict how many wrapping paper rolls need to be sold to raise $500.

Based on the data, about _____ wrapping paper rolls is a reasonable prediction of how many rolls need to be sold to raise $500.
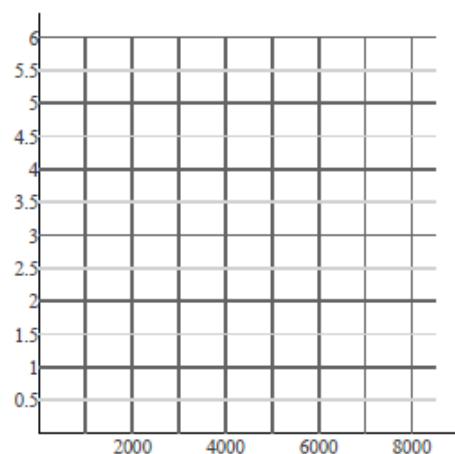

Fund-raiser
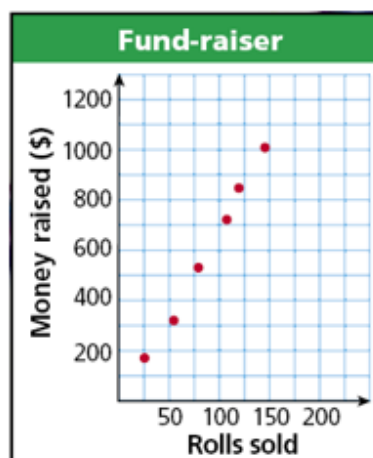
State if there appears to be a positive correlation, negative correlation, or no correlation. When there is a correlation, identify the relationship as linear or nonlinear.
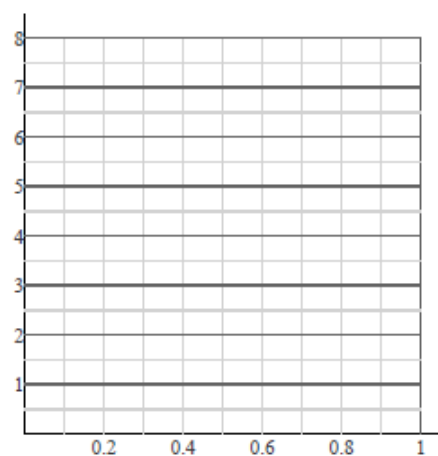
1)

2)

3)

4)

5)

6)

46

Construct a scatter plot.

7)

X	Y
300	1
800	1
1,100	2
1,600	2
1,700	2

X	Y
1,800	3
3,400	3
4,700	4
6,000	4
8,500	6

8)

X	Y
0.1	7.5
0.1	7.6
0.3	4.5
0.4	3.2

X	Y
0.4	3.3
0.6	1.4
0.6	1.7

X	Y
0.6	1.8
0.9	1.5
1	1.7

Construct a scatter plot. Find the slope-intercept form of the equation of the line that best fits the data.

9)

X	Y
10	700
10	800
30	400
30	500

X	Y
40	300
60	200
70	100

X	Y
70	100
80	100
100	200

10)

X	Y
1	20
2	40
3	50
4	60

X	Y
5	70
6	80
7	80
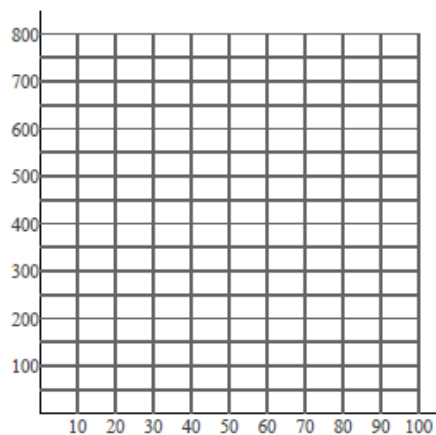
X	Y
7	80
9	80
10	80
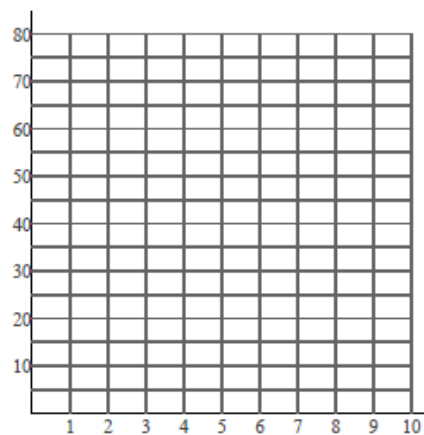
This activity is designed to help you to learn about scatterplots and correlation. In order to complete the activity you will need a partner.

1. Before finding a partner, rank the following ten cafeteria foods in order from the food you like the most to the food you like the least.

   1. Pizza
   2. Steak
   3. Hamburger
   4. Fries
   5. Pretzel
   6. Salad
   7. Cookies
   8. Chicken Sandwiches
   9. Ice Cream
   10. Popsicles

Record your preferences below:

The number of the food I like the most is: _____

The number of the food I like 2nd most is: _____

The number of the food I like 3rd most is: _____

The number of the food I like 4th most is: _____

The number of the food I like 5th most is: _____

The number of the food I like 6th most is: _____

The number of the food I like 7th most is: _____

The number of the food I like 8th most is: _____

The number of the food I like 9th most is: _____

The number of the food I like the least: _____

2. Now get together with your partner. Write your responses for the 10 items above as ordered pairs. For example, if your 1st favorite food is pizza and your partner's favorite food is Fries, write the ordered pair (1, 4). Then go on to the food you both like second most. You will have 10 ordered pairs. Whoever uses their choice as the x-coordinate should remain the x-coordinate for all 10 ordered pairs.
   List the ordered pairs here: _____

3. Plot your 10 points on the coordinate plane below.

_____'s Food Preferences
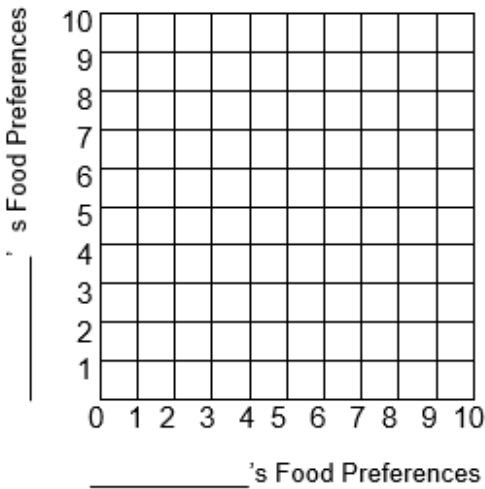
4. Analyze the Data:

- The stronger the positive association, the more likely you and your partner would enjoy going out to eat together.
- The stronger the negative association, the less likely you and your partner would enjoy going out to eat together.
- If the association is weak, then your agreement on dinner would be hit and miss.

What conclusions can you draw based upon your scatterplot?
_____
_____
_____
_____

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Practice B

Scatter Plots and Trend Lines

Graph a scatter plot using the given data.

1. The table shows the percent of people ages 18–24 who reported they voted in the presidential elections. Graph a scatter plot using the given data.

Year	1988	1992	1996	2000	2004
% of 18-24 year olds	36	43	32	32	42

Record of Voting
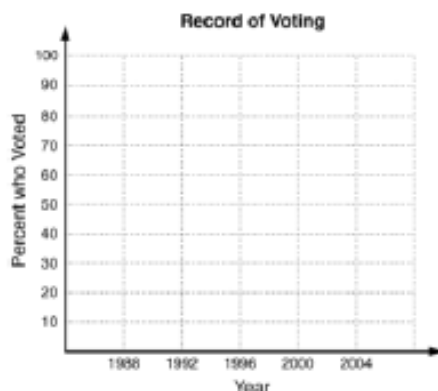
Write *positive*, *negative*, or *none* to describe the correlation illustrated by each scatter plot.

2. House Painting

_____

3. Tests

_____

4. Identify the correlation you would expect to see between the number of pets a person has and the number of times they go to a pet store. Explain.

_____

_____

Neal kept track of the number of minutes it took him to assemble sandwiches at his restaurant. The information is in the table below.

Number of sandwiches	1	2	4	6	7
Minutes	3	4	5	6	7

5. Graph a scatter plot of the data.

6. Draw a trend line.

7. Describe the correlation.

_____

8. Based on the trend line you drew, predict the amount of time it will take Neal to assemble 12 sandwiches.
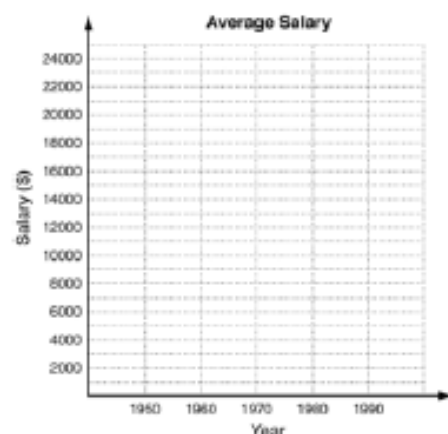
_____

Sandwich Assembly
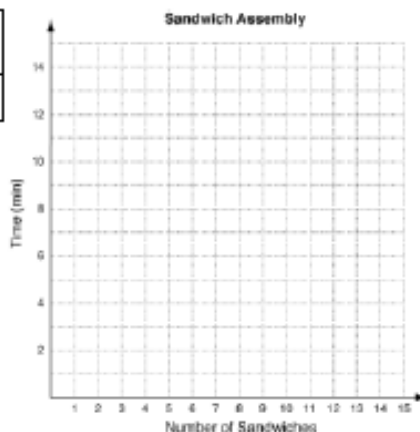
Practice C

Scatter Plots and Trend Lines

Average Salary

Graph a scatter plot using the given data.

1. The table shows the average salary (rounded to the nearest hundred) for one type of worker, listed by decade. Graph a scatter plot using the given data.

Decade	1950	1960	1970	1980	1990
Avg. Salary	$2800	$4800	$8300	$15,400	$23,700

**Identify the correlation you would expect to see between the pair of data sets. Explain.**

2. The number of chicken pox vaccines given and the number of chicken pox cases reported.

_____

_____

3. The number of vacation days given to employees and their level of job satisfaction.

_____

_____

The average number of gallons of coffee per person consumed in the United States is shown in the table below.

Years	1998	1999	2000	2001	2002	2003
Avg. annual per capita consumption	23.9	25.1	26.3	24.2	23.6	24.3

4. Graph a scatter plot of the data.

5. Draw a trend line.

6. Describe the correlation.

_____

7. Based on the trend line you drew, predict the average amount of coffee consumed per person in 2007.

_____

8. How confident are you in your prediction? Explain.

_____

_____

_____


Coffee Consumption
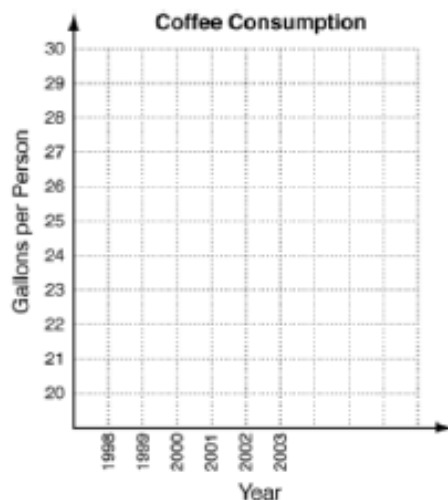
Problem Solving

Scatter Plots and Trend Lines

Fawn is trying to improve her reading skills by taking a speed-reading class. She is measuring how many words per minute (wpm) she can read after each week of the class.

1. Graph a scatter plot using the given data.

Weeks	1	2	3	4	5
wpm	220	230	260	260	280

Reading Speed

2. Describe the correlation illustrated by the scatter plot.

_____

_____
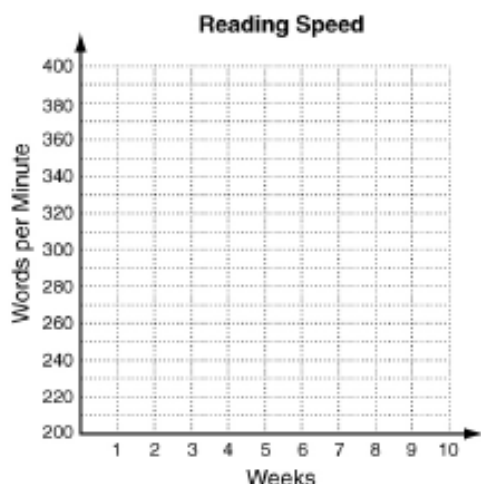
3. Draw a trend line and use it to predict the number of words per minute that Fawn will read after 8 weeks of this class.

_____

4. Fawn is paying for this class each week out of her savings account. Identify the correlation between the number of classes and Fawn's account balance.

_____

_____

Choose the scatter plot that best represents the described relationship.

5. the distance a person runs and how physically tired that person is

    A Graph 1   C Graph 3

    B Graph 2   D Graph 4

6. the price of a new car and the number of hours in a day

    F Graph 1   H Graph 3

    G Graph 2   J Graph 4
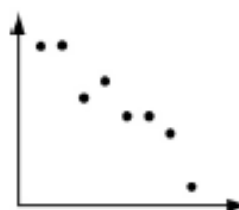
7. a person's age and the amount of broccoli the person eats

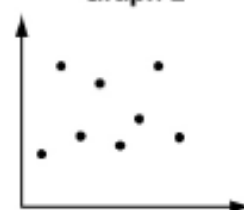   A Graph 1   C Graph 3

    B Graph 2   D Graph 4

8. the number of cats in a barn and the number of mice in that barn

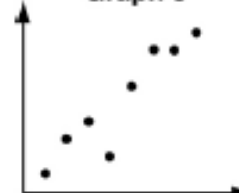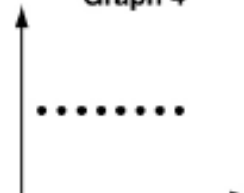   F Graph 1   H Graph 3

    G Graph 2   J Graph 4

Graph 1

Graph 2

Graph 3

Graph 4

Review for Mastery

Scatter Plots and Trend Lines
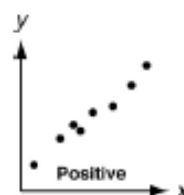
Correlation is one way to describe the relationship between two sets of data.

Positive Correlation
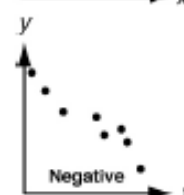
      Data: As one set **increases**, the other set **increases**.
      Graph: The graph **goes up** from left to right.

Negative Correlation

      Data: As one set **increases**, the other set **decreases**.
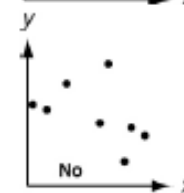   Graph: The graph **goes down** from left to right.

No Correlation

      Data: There is **no relationship** between the sets.
      Graph: The graph has **no pattern**.

Identify the correlation you would expect to see between the number of grams of fat and the number of calories in different kinds of pizzas.

When you *increase* the amount of fat in a food, you also *increase* calories. So you would expect to see a positive correlation.
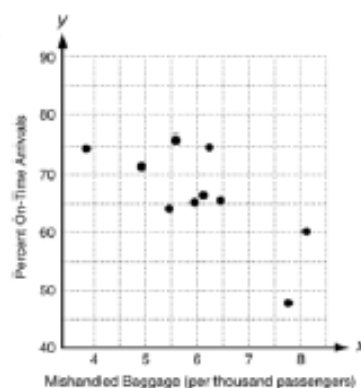
Identify the correlation you would expect to see between each pair of data sets. Explain.

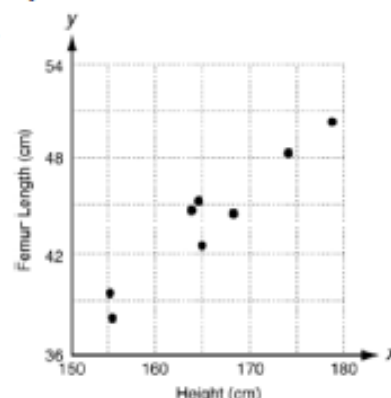1. the number of knots tied in a rope and the length of the rope

_____

2. the height of a woman and her score on an algebra test

_____

Describe the correlation illustrated by each scatter plot.

3.

Percent On-Time Arrivals (y-axis: 40, 50, 60, 70, 80, 90)
Mishandled Baggage (per thousand passengers) (x-axis: 4, 5, 6, 7, 8)

4.

Femur Length (cm) (y-axis: 36, 42, 48, 54)
Height (cm) (x-axis: 150, 160, 170, 180)

_____   _____

Review for Mastery

Scatter Plots and Trend Lines continued

By drawing a trend line over a graph of data, you can make predictions.

The scatter plot shows a relationship between a man's height and the length of his femur (thigh bone). Based on this relationship, predict the length of a man's femur if his height is 160 cm.

Step 1: Draw a trend line through the points.
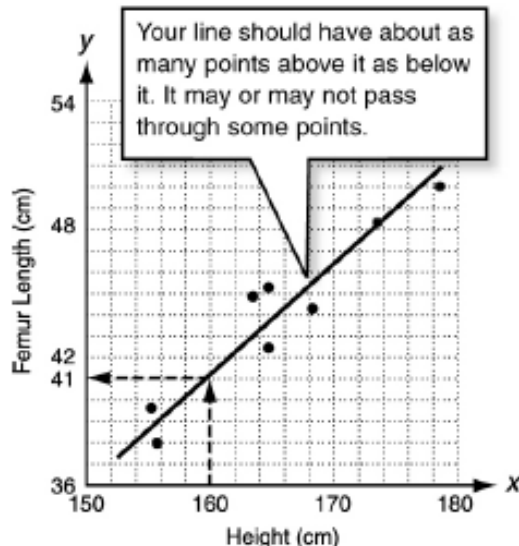
Step 2: Go from 160 cm on the x-axis up to the line.

Step 3: Go from the line left to the y-axis.

The point (160, 41) is on the line.

Height   Femur
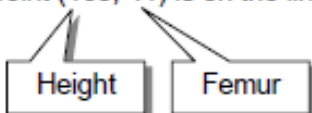
A man that is 160 cm tall would have a femur about 41 cm long.

To find an x-value, go right from the y-value, and then down to the x-value. So, a man with a 42 cm femur would be about 162 cm tall.

> Your line should have about as many points above it as below it. It may or may not pass through some points.

The scatter plot shows a relationship between engine size and city fuel economy for ten automobiles.
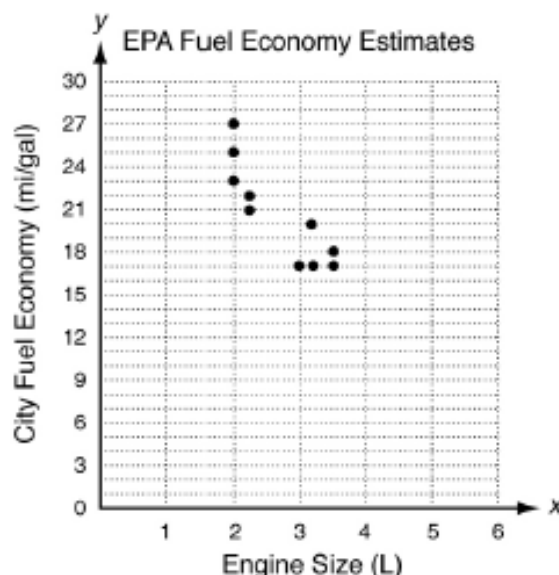
5. Draw a trend line on the graph.

6. Based on the relationship, predict...

a. the city fuel economy of an automobile with an engine size of 5 L.

_____

b. the city fuel economy of an automobile with an engine size of 2.8 L.

_____

c. the engine size of an automobile with a city fuel economy of 11 mi/gal.

_____

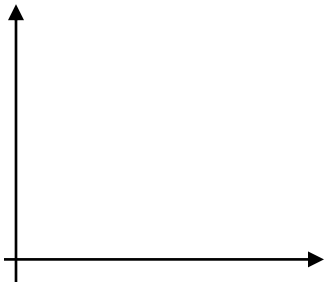d. the engine size of an automobile with a city fuel economy of 28 mi/gal.

_____

Sketch a graph for each situation. Label the x and y axis. Tell whether the graph is continuous or discrete.

1. A girl was walking home at a steady pace. Then she stopped to talk

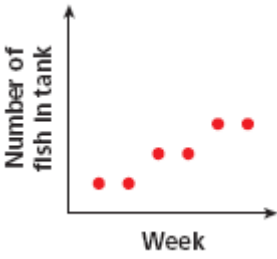to a friend. After her friend left, she jogged the rest of the way home.

_____
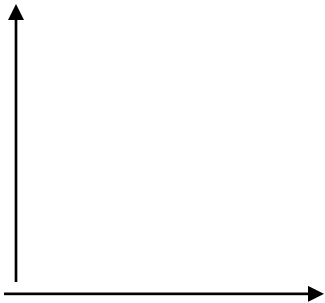
2. A ball is dropped from a second story window and bounces to a stop
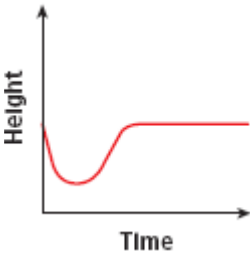
on the patio below.
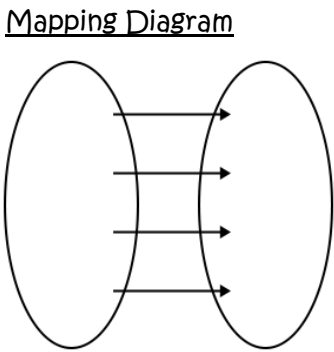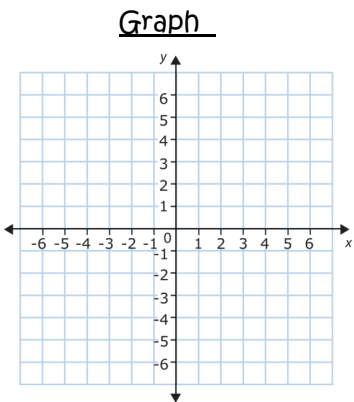
_____

Write a possible situation for each graph.

3.

Number of fish in tank

Week

4.

Height

Time

_____
_____
_____
_____
_____
_____

_____
_____
_____
_____
_____
_____

Express the relation as a table, graph, and mapping diagram.

5. $-1,0$, $0,1$, $2,1$, $-3,4$

Table	Graph	Mapping Diagram

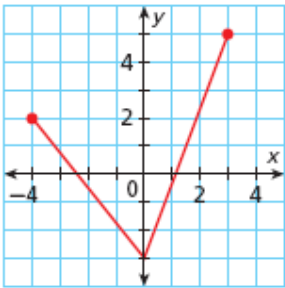| x	y

Give the domain and range of each relation.

6. $-2,-1$, $-1,0$, $0,-1$, $1,0$, $2,-1$ 7.

D: _____
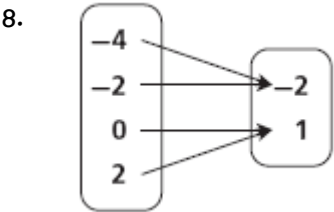
R: _____

D: _____

R: _____

Determine if the relation is a function or not. Write yes or no on the line.

8.   9. $-5,-3$, $-3,-2$, $-1,-1$, $1,0$ 10.

x	1	2	3	4	1
y	3	2	1	0	−1

-4
-2 → -2
0   → 1
2

_____   _____   _____

Determine the relationship between x and y. Write an equation on the line.

11.

x	1	2	3	4
y	−6	−5	−4	−3

_____

12. $1,9$, $2,18$, $3,27$, $4,36$

_____

Identify the dependent and independent variables.   Write and equation in function notation for the situation.

13. A baker spends $6 on ingredients for each cake he bakes.

Dependent: _____   Independent: _____

Function: _____

14. Arlando will buy twice as many CDs as Dante.

Dependent: _____   Independent: _____

Function: _____

Evaluate each function for the given values. Write your answer on the line.
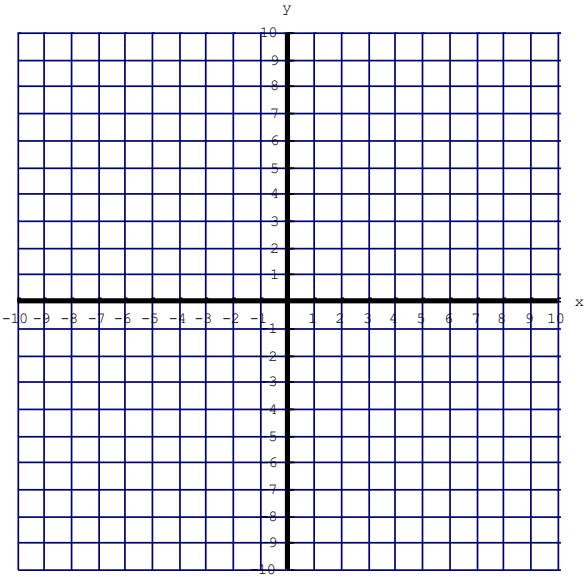
15. For $f(x) = -2x + 4$, find $f(x)$ when $x = -5$ _____

16. For $g(x) = -x^2 - 2$, find $g(x)$ when $x = -3$ _____

Graph each function for the given domain.

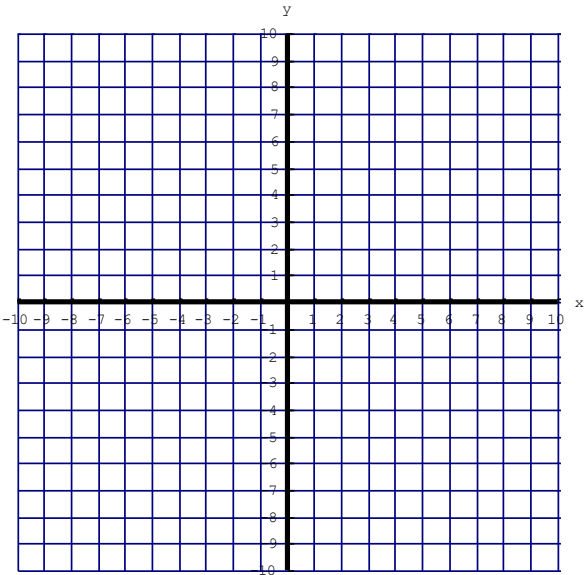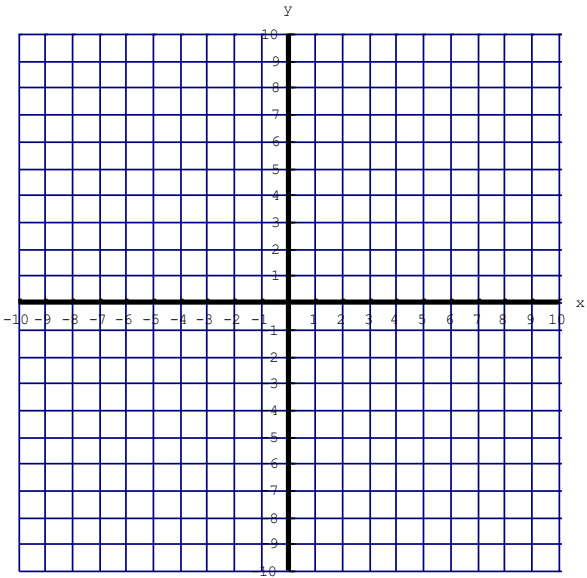17. $4x + y = 2$ $D: -2, -1, 1, 2$

X	y =	(x,y)

Graph each function.

18. $y = x^2 - 6$

X	y =	(x,y)

19. $y = 2 - |x|$

X	y =	(x,y)

20. $3x - y = 1$

X	y =	(x,y)