Name: _____Period: _____

Algebra 1-2: 2.1a Modeling Quantities Homework (textbook section 1.2)

A unit rate is a rate with a denominator of 1. Following the example, write each comparison as a unit rate.

Example: Walking 5 miles in 2 hours is 2.5 miles per hour.

1) 759 miles on 22 gallons of gas
2) $25.92 for 12 key chains
3) 2,220 Calories in 6 servings
4) 12,750 texts in 30 days

Use dimensional analysis to convert the measurements.

5) Convert 8 milliliters to fluid ounces. Use 1 mL ≈ 0.034 fl oz
6) Convert 12 kilograms to pounds. Use 1 kg ≈ 2.2 lb.
7) Convert $ 950 US to pounds Use $1 = 0.62 British pound sterling.
8) The bakers at the bakery can make 2 bagels per minute. How many bagels can they bake in an eight hour shift?
9) A Ferris wheel can accommodate 75 people in 30 minutes. If the park is open 15 hours per day, how many people can the ride carry for the entire day?
10) Last year, Amazon reportedly sold 26 million items on Cyber Monday. Assuming they were open 24 hours, how many items is that per second?

Reflect: Why is it important to convert rates to the same units before comparing them?

Use dimensional analysis to determine which rate is greater.

11) Tortoise A walks 52.0 feet per hour and tortoise B walks 12 inches per minute. Which tortoise travels faster? Explain.

12) The pitcher for the Robins throws a baseball at 90.0 miles per hour. The pitcher on the Bluebirds throws a baseball 121 feet per second. Which pitcher throws a baseball faster? Explain.

13) For a science experiment Marcia dissolved 1.0 kilogram of salt in 3.0 liters of water. For a different experiment, Bobby dissolved 2.0 pounds of salt in 7.0 pints of water. Which person made a more concentrated salt solution? Explain. Use 1 L = 2.11 pints. Round your answer to the nearest hundredth.

14) Will a stand that can hold up to 40 pounds support a 21-kilogram television? Explain.
Use 2.2 lb = 1 kg

Name: _____Period: _____

Algebra 1-2: 2.1b Problems with Rates and Ratios Homework (textbook section 1.2)

1. Jan estimates that the faucet in her kitchen drips at a rate of 1 drop every 2 seconds. Estimate how many times the faucet drips in a week. Show your calculations

2. Jan estimates that approximately 575 drops fill a 0.1 liter bottle. Estimate how much water her leaky faucet wastes in a year. Show your calculations and express you final answer in liters.

3. Your Facebook news feed gets updated with one picture every 12 minutes.

    a. How many total pictures were uploaded in one day?

    b. If you had 4 friends uploading pictures that day, approximately how many pictures did each person upload?

    c. What is the rate in pictures uploaded per minute of your friends?

4. You drive to your friend's house at a speed of 40 miles per hour.
    a. What is your speed in feet per second (1 miles = 5280 feet)?

    b. If you get there in 25 minutes, how far does your friend live in miles?

    c. How far does your friend live in feet?

5. A police officer saw a car travel 1800 feet in 30 seconds. The speed limit on the road was 35 miles per hour. Was the car speeding? Justify your answer mathematically.

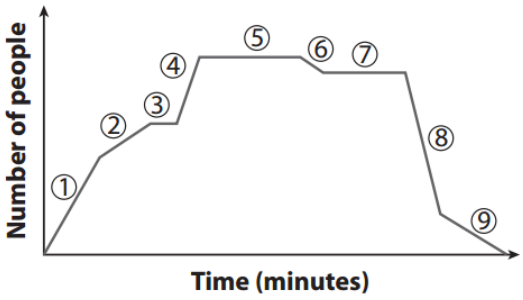
6. **Find the error:** The dwarf sea horse swims at a rate of 52.68 feet per hour. A student was asked to convert this speed to inches per minute. Her work is shown below. Find and correct her error.

$$\frac{52.68 \text{ feet}}{1 \text{ hour}} \bullet \frac{1 \text{ foot}}{12 \text{ inches}} \bullet \frac{1 \text{ hour}}{60 \text{ min}} = 0.07 \text{ inches/ minute}$$

Name: _____Period: _____

Algebra 1-2: 2.2a Interpreting Graphs Homework (textbook section 3.1)

The graph shows the attendance at a football game, and the rate at which the fans enter and exit the stadium.



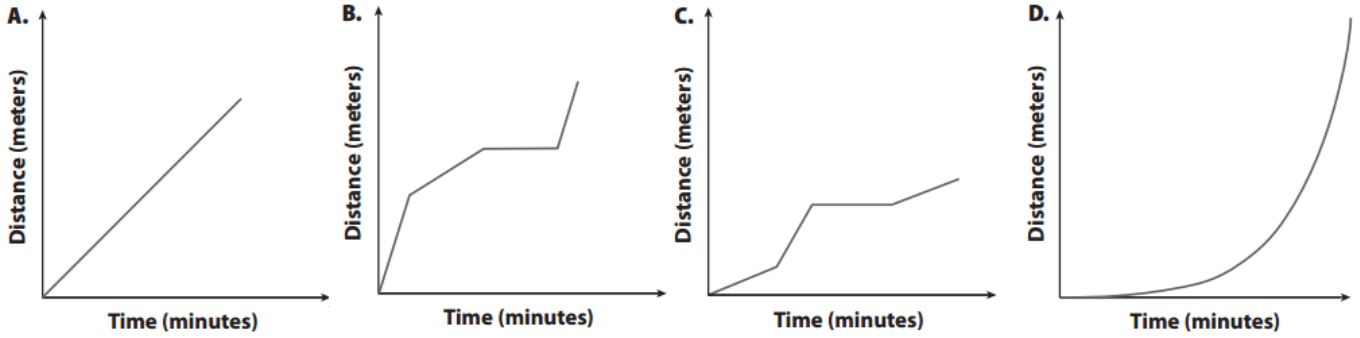
1) Compare segments 1 and 2. What do they represent?

2) What does segment 8 represent in terms of the game?

3) What is the significance of segments 5 and 7?

4) What does segment 6 mean?

Janelle alternates between running and walking. She begins by walking for a short period, and then runs for the same amount of time. She takes a break before beginning to walk again.

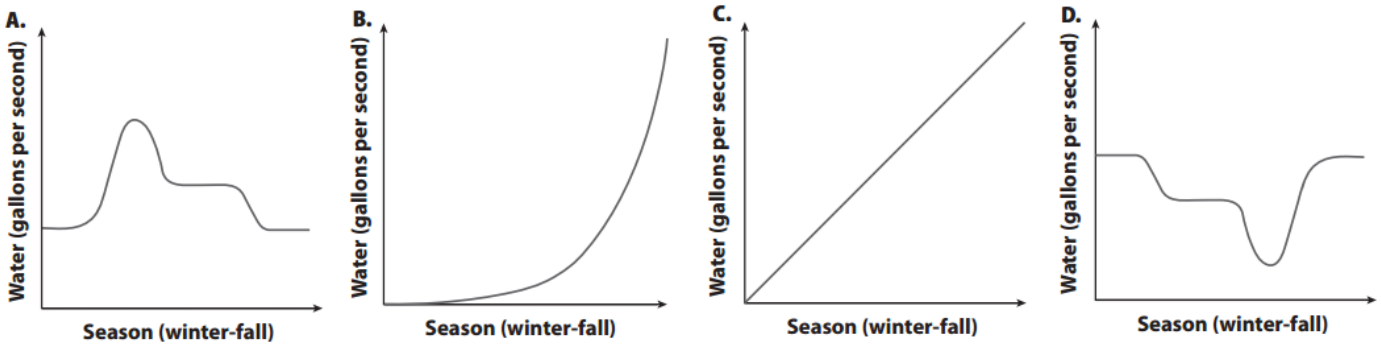


5) Which graph best represents the given situation? _____

6) What if Janelle began by running, then slowed to a walk, stopped, and then began running again. Which graph would represent this situation? _____

7) What are possible situations for graphs A and D?

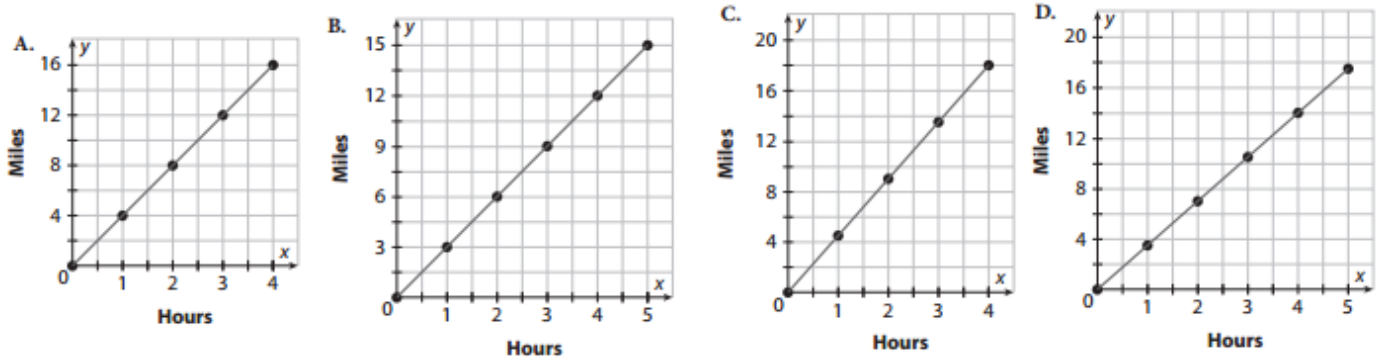
During the winter, the amount of water that flows down a river remains at a low constant. In the spring, when the snow melts, the flow of water increases drastically, until it decreases to a steady rate in the summer. The flow then slowly decreases through the fall into the winter. Consider the graphs shown.



8) Which graph best represents the given situation? _____

9) Describe the other three graphs. What are possible situations that they are representing?

10) Match each graph to the data it goes with. Explain your reasoning



Mike walks 3 miles per hour for 5 hours

Brad walks 3.5 miles per hour for 5 hours

Jesse walks 4 miles per hour for 4 hours.

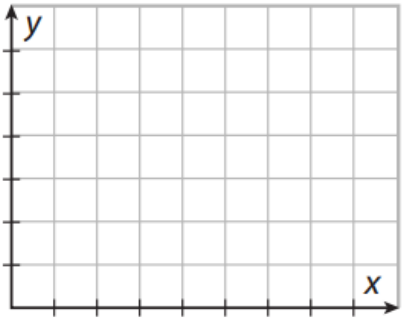
Josh walks 4.5 miles per hour for 4 hours.

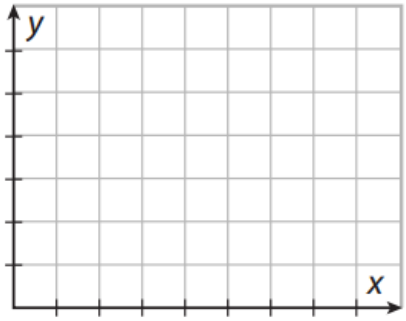
Name: _____Period: _____

Algebra 1-2: 2.2b Graphing Relationships Homework (textbook section 3.1)

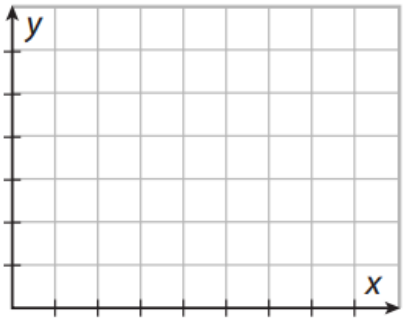
Would the following graphs be discrete or continuous?

1) Money raised from children selling lemonade. _____
2) Amount of rain collected in a rain gauge during a storm. _____
3) Calories burned while exercising. _____
4) Cost of a field trip to the zoo with admission of $10 per person. _____
5) Find the unit rate, create scales on the x- and y-axes, and then graph the function.
   a. Mike walks 24 miles in 8 hours.
   b. Mason sold 10 wristbands and made a total of 5 dollars.

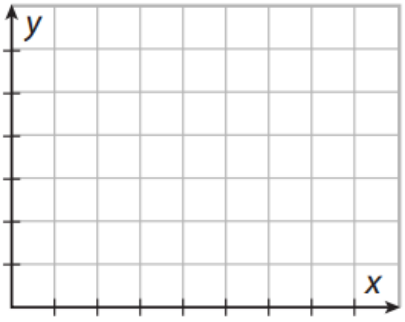




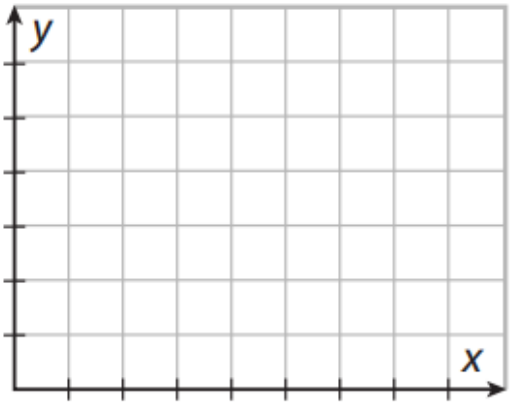
6) A plane takes off and climbs steadily for 15 minutes until it reaches 30,000 feet. It travels at that altitude for 2 hours until it begins to descend to land, which it takes 15 minutes at a constant rate
   a. Will the graph be discrete or continuous?
   b. The domain is _____
   c. The range is _____
   d. Graph the situation using appropriate labels and scales.



7) A contestant on a game show is given $100 and is asked five questions. The contestant loses $20 for every wrong answer
   a. Will the graph be discrete or continuous?
   b. The domain is _____
   c. The range is _____
   e. Graph the situation using appropriate labels and scales.



8) At the start of a snowstorm, it snowed two inches an hour for two hours, then slowed to one inch an hour for an additional hour before stopping. Three hours after the snow stopped, it began to melt at one-half an inch an hour for two hours.



a. Will the graph be discrete or continuous?

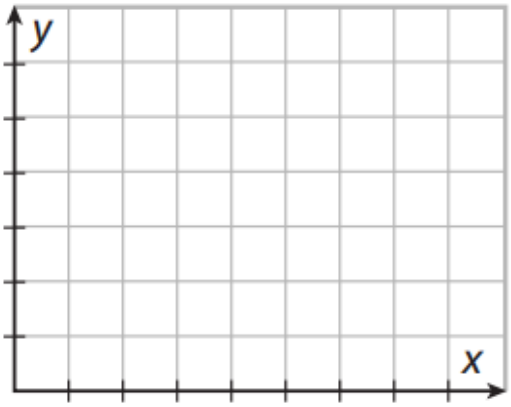
b. The domain is _____

c. The range is _____

d. Use unit rates to graph each section.

Section	Time (x)	Snow (y) (TOTAL amount)

9) A car travels at 65 mph for 1 hour on the highway. It stops it a rest stop for 15 minutes. It then travels in heavy traffic at 30 mph for 30 minutes.



a. Will the graph be discrete or continuous?

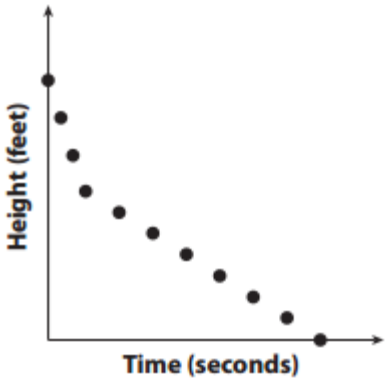
b. The domain is _____

c. The range is _____

d. Use unit rates to graph each section.

Section	Time (x)	Distance (y)

10) **Explain the Error:** A student is told to draw a graph of the situation which represents the height of a skydiver with respect to time. He drew the following graph. Explain the student's error and draw the correct graph



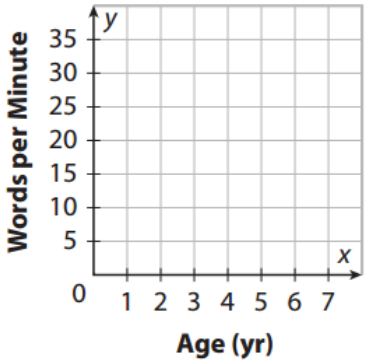
Name: _____Period: _____

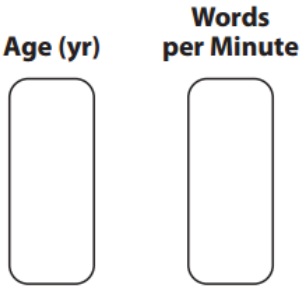
Algebra 1-2: 2.3a Representing Relations and Functions Homework (textbook section 3.2)

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

1) The relation represents ages of students and the number of words they can write per minute. $\{(5, 10), (6, 20), (6, 23), (7, 35)\}$

x	y

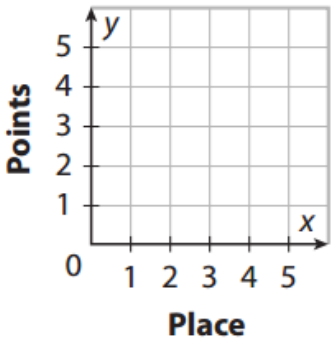


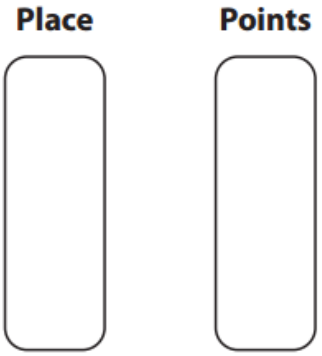


$\{(1, 5), (2, 3), (3, 2), (4, 1), (5, 0)\}$

2) The relation represents the place won in a track meet and the number of points that place finish is worth.

x	y





3) Determine if problems 1 and 2 are functions. Justify your answers.

a. Problem 1: students and the number of words they can write per minute.

b. Problem 2: the place won in a track meet and the number of points that place finish is worth

4) State the domain and range of each relation.

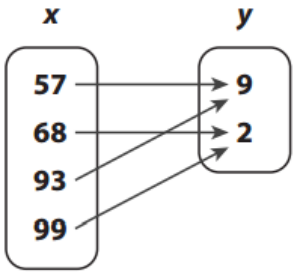
A.

x	y
2	5
7	8
8	15
11	12
15	19

Domain: _____

Range: _____

B.



Domain: _____

Range: _____

C. $\{(-6,-6),(-2,0),(1,4),(4,-4),(6,-6),(8,-4),(8,0)\}$

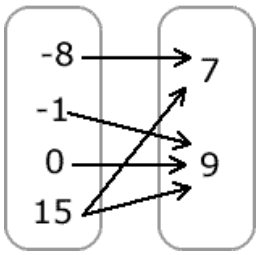
Domain: _____

Range: _____

Determine if the relations are functions. Justify your answers.

5) $\{(2,\ -9),\ (6,\ 8),\ (8,\ 1),\ (2,\ -2),\ (11,\ -7)\}$

6)
7)



7)

Time (min)	Calories burned
20	50
30	85
35	85
60	100

8) For each scenario, tell whether the relation represents a function.

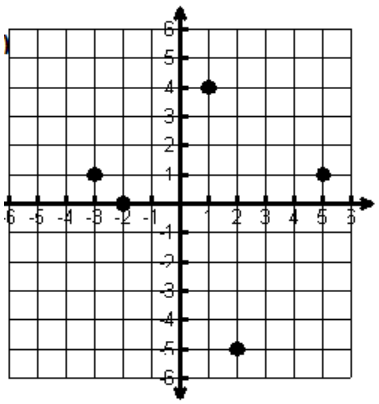
Input → Output	FUNCTION (Yes/No)	Explain
City → Zip Code	_____	_____
Last Name → First Name	_____	_____
Person → Birthday	_____	_____
State → Capital	_____	_____

Name: _____Period: _____

Algebra 1-2: 2.3b Representing Relations and Functions in Graphs Homework (textbook section 3.2)

Determine if the following graphs are functions and list their domain and range.

1)

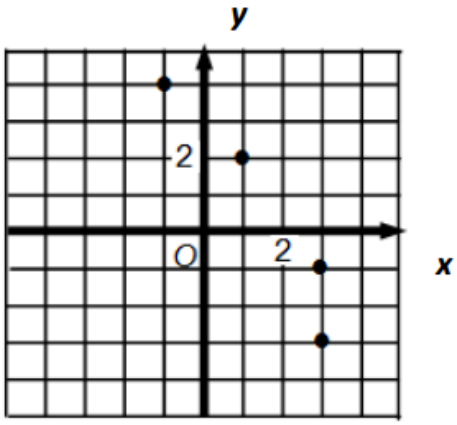


Function: *Yes* *No*

Domain: _____

Range: _____

2)

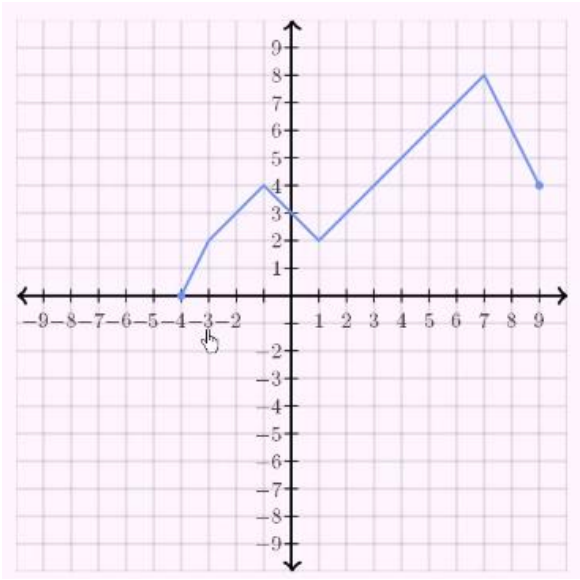


Function: *Yes* *No*

Domain: _____

Range: _____

3)

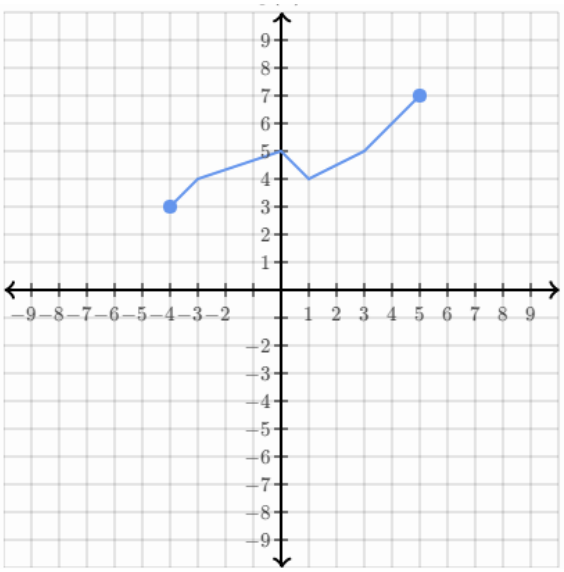


Function: *Yes* *No*

Domain: _____

Range: _____

4)

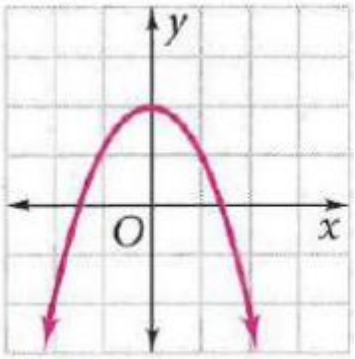


Function: *Yes* *No*

Domain: _____

Range: _____

5)

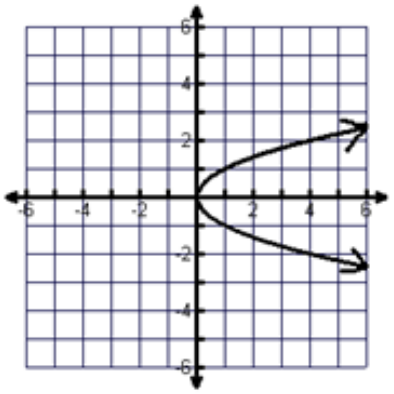


Function: *Yes* *No*

Domain: _____

Range: _____

6)

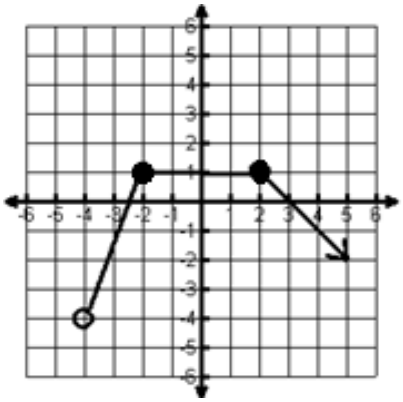


Function: *Yes* *No*

Domain: _____

Range: _____

7)

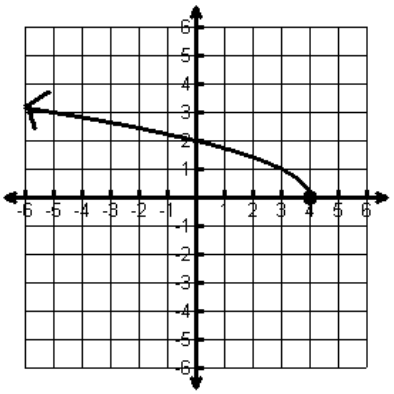


Function: *Yes* *No*

Domain: _____

Range: _____

8)



Function: *Yes* *No*

Domain: _____

Range: _____

9) Why does the vertical line test work?

10) Can a relation be a function if a horizontal line passes through more than one point on its graph? Explain.

Name: _____Period: _____

Algebra 1-2: 2.4a Modeling with Functions – Function Notation Homework (textbook section 3.3)

1) Identify dependent and independent variables in each situation

	Independent variable	Dependent variable
a) The total cost of running a business is based on its expenses.		
b) The price of a house depends on its square footage (area).		
c) The time it takes you to run a certain distance depends on the distance.		
d) The temperature outside at different times of the day.		

For each situation, identify the independent and dependent variables. Write a function in function notation. Then use the function to solve the problem.

2) Almira earns $50 an hour. How much does she earn in 6 hours?

Dependent: _____Independent_____

Function: Solution:

Write a sentence interpreting your answer.

3) Stan, a local delivery driver, is paid $3.50 per mile driven plus a daily amount of $75. On Monday, he is assigned a route that is 30 miles long. How much is he being paid for that day?

Dependent: _____Independent_____

Function: Solution:

Write a sentence interpreting your answer.

4) Bruce owns a small grocery store and charges $4.75 per pound of produce. If a customer orders 5 pounds of produce, how much does Bruce charge the customer?

Dependent: _____Independent_____

Function: Solution:

Write a sentence interpreting your answer.

5) Georgia, a florist, charges $10.95 per flower bundle plus a $15 delivery charge on the order. If Charlie orders 8 bundles of flowers and has them delivered, how much does Georgia charge Charlie?

Dependent: _____Independent_____

Function: Solution:

Interpret:

6) Allison owns a music store and sells DVDs at $17.75 per DVD. If Craig orders 5 DVDs, how much does it cost?

Dependent: _____Independent_____

Function: Solution:

Interpret:

7) Anne buys used cars at auction for $2000 per car. There is a $150 fee to take part in the auction. If Anne buys 13 used cars, how much does she pay in total?

Dependent: _____Independent_____

Function: Solution:

Interpret:

8) Harold, a real estate developer, sells houses at $250,000 per house. If he sells 9 houses, how much does he earn?

Dependent: _____Independent_____

Function: Solution:

Interpret:

9) Gordon buys 3 HD TVs for $1200 each. There is a shipping charge of $90 to have the TVs delivered to his house. How much does Gordon pay in total?

Dependent: _____Independent_____

Function: Solution:

Interpret:

10) Autumn sells laptop computers for $600 each. If she sells 68 computers, how much money does she earn?

Dependent: _____Independent_____

Function: Solution:

Interpret:

Name: _____Period: _____

Algebra 1-2: 2.4b Modeling with Functions – Function Notation Practice Homework (textbook section 3.3)

1) A student evaluated $g(x) = -5x + 3$ for $x = -3$. Describe and correct the error the student made:

$$g(-3) = -5(-3) + 3$$

$$-3g = 18$$

$$g = -6$$

Find the value of *x* so that the function has the given value.

2) $f(x) = 6x + 9; for\ f(x) = 3$

3) $h(x) = -7x + 12;\ for\ h(x) = -9$

4) $m(x) = 9x - 5;\ for\ m(x) = -2$

5) $f(x) = 4x + 11;\ for\ f(x) - 13$

6) Jacob has started a new job working for his neighbor Paul. Paul said that his weekly pay would be a function of the hours he worked. What does this mean?

7) Can y be used instead of $f(x)$ in function notation? If so, tell why. If not, give an example of a function not written in function notation and the same function written in function notation.

8) When Janet bought a car, she paid $1500 for a down payment and makes a payment of $245 each month, starting one month after the down payment.

a. Write a function that represents the amount of money she has paid on her car after m months.

b. How much has she paid in total on the car after 3 months?

c. If Janet must pay a total of $16,200 for the car, after how many months will she make the final payment on the car?

9) A florist delivers flowers to anywhere in town. d is the distance from the delivery address to the florist shop in miles. The cost to deliver flowers, based on the distance d, is given by $C(d) = .45d + 22.50$. Evaluate this function for domain and range values given and describe what the values of the function represent.

Evaluate Interpret

a. $C(6) =$

b. $C(d) = 27.90$

10) Describe the function $f(t) = 20t + 50$ using a table and a story that this function is describing. Describe what is represented by the domain and what is represented by the range.

Name: _____Period: _____

Algebra 1-2: 2.5a Modeling with Functions – Domain and Range Discrete Data Homework
(textbook section 3.3-3.4)

1) The following is a list of years and batting averages for Barry Bonds of the San Francisco Giants: 1996, 0.315; 1997, 0.291; 1998, 0.302; 1999, 0.261; and 2000, 0.303. Find the domain and range of the function year vs. batting average.

   Domain: {_____}.

   Range: {_____}.

2) A bowling alley charges $4 to rent shoes and $5 per game. You have time to play up to 5 games.

   Function:

   Domain: {_____}.

   Range: {_____}.

3) Mary has already sold $55 worth of tickets to the benefit concert. She has 3 tickets left to sell at $7 per ticket.

   Function:

   Domain: {_____}.

   Range: {_____}.

4) An Internet company charges $5 per hour for the first 3 hours of service plus a $10 connection fee.

   Function:

   Domain: {_____}.

   Range: {_____}.

5) A newspaper charges $3 per line for the first 4 lines plus a $20 fee to advertise.

Function:

Domain: {_____}.

Range: {_____}.

6) A law firm charges $100 per hour (or any portion thereof) for the first 6 hours plus a $300 origination fee for its services.

a. Write a function for the cost of receiving h hours of service.

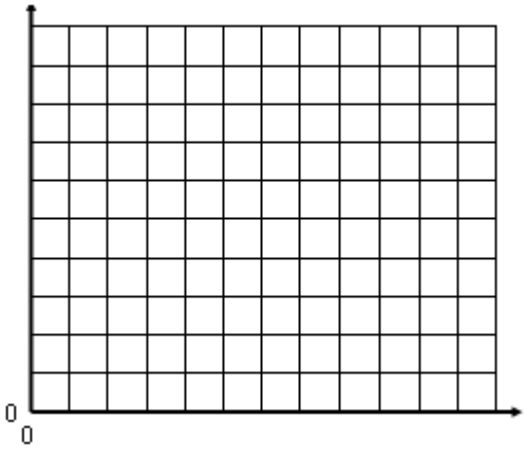
b. Domain:

{_____}.

c. Range:

{_____}.

d. Graph the function



7) The function $f(x) = -6x + 11$ has a range given by $\{-37, -25, -13, -1\}$. Select the domain values of the function from the list $1, 2, 3, 4, 5, 6, 7, 8$. Explain how you arrived at your answer.

Name: _____Period: _____

Algebra 1-2: 2.5b Modeling with Functions – Domain and Range of Continuous Data Homework (textbook sections 3.3-3.4)

1) The average price of a movie ticket in the United States from 1990 to 2010 can be modeled by the function $P(n) = 0.20n + 5.39$ where n is the number of years since 1990.

   a. List the terms in the function and interpret what they represent.

   b. The domain represents_____. The range represents_____
   What are the restrictions? Do they effect the domain or range?

   c. Translate the restrictions into a reasonable domain and range

   Domain: _____$\leq x \leq$_____ Range: _____$\leq y \leq$_____

   d. Find the value of x so that $P(n) = 8.39$. Explain what the solution means in the situation.

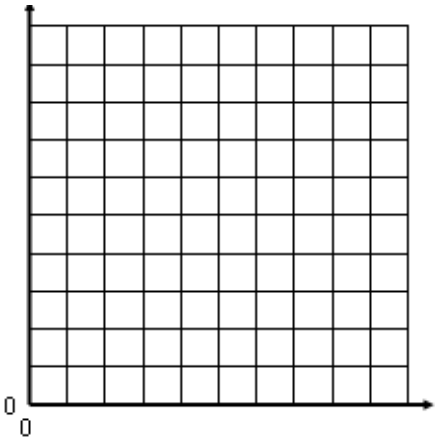
2) An in-line skater's average speed is 10 miles per hour. The skater is working hard to build up his stamina, but at this point, the longest skate he has had was 4.5 hours.

   a. Write a function representing the distance traveled after skating h hours _____

   b. Identify the domain and range and graph the function

   Domain: _____$\leq x \leq$_____

   Range: _____$\leq y \leq$_____



   c. Find the value of h for $D(h) = 15$ Explain what the solution means in the situation.

Name: _____Period: _____

Algebra 1-2: 2.6 Multiple Representations of Functions Homework (textbook sections 3.3-3.4)

Use the multiple representations from today's classwork to answer the following questions:

Problem #1 – Plumbing Costs

1) What are reasonable domain and range for a job projected to last between 12 and 16 hours?

2) Find and interpret the meaning of $f(3)$

3) Find and interpret the meaning of $f(h)=1350$

Problem #1 – Bungee Jumper

4) Would changing the starting height of the platform to 500 feet effect the domain or range? How?

5) Use your graph to estimate the value of $h(1.5)$ and interpret its meaning in the context of the problem.

6) What would be the significance of the value of $h(t)=0$

Problem #3 – Riding to the Library

7) Find and interpret the meaning of $f(3)$

8) Why are the domain and range in this problem expressed as intervals rather than as individual values?

9) Why does the coefficient of the variable negative in this scenario?

10) What in the problem would need to change for the coefficient to be positive?

Problem #4 – Science Center

Write and answer three questions about this scenario.