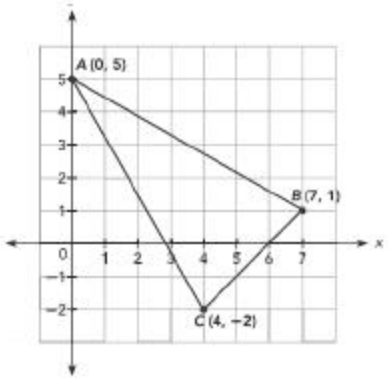
Lesson 6.1 Understanding Functions and Relationships Day 2

Week 1 Friday Course 3 Warm-up

George paid $2.75 for 4 granola bars and 1 apple. Addison paid $2.25 for 2 granola bars and 3 apples. Find the cost of each granola bar and each apple.

Finding Distance
Find the distance from B to C

Let $B\,(7, 1)$ be (x_1, y_1) and $C\,(4, -2)$ be (x_2, y_2)



The support pole of the tent shown forms one leg of a right triangle. One side of the tent forms the hypotenuse of the right triangle. Find the length of the base of the tent.

Less

Week 1 Friday Course 3 Warm-up

George paid $2.75 for 4 granola bars and 1 apple. Addison paid $2.25 for 2 granola bars and 3 apples. Find the cost of each granola bar and each apple.

Granola bar: $0.60; Apple: $0.35

Distance Formula

Let $B(7, 1)$ be (x_1, y_1) and $C(4, -2)$ be (x_2, y_2)

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\sqrt{(4 - 7)^2 + [(-2) - 1]^2}$$

$$\sqrt{(-3)^2 + (-3)^2}$$

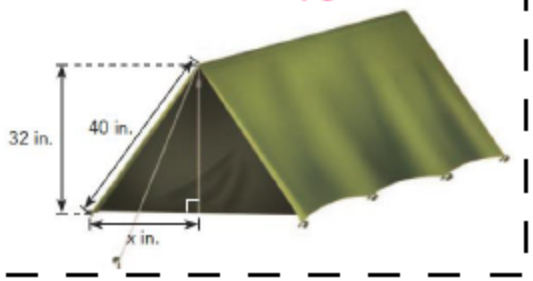
$$\sqrt{9 + 9}$$

$$\sqrt{18} \text{ units}$$

The support pole of the tent shown forms one leg of a right triangle. One side of the tent forms the hypotenuse of the right triangle. Find the length of the base of the tent.

The length of half the base of the tent is 24

So, the length of the base of the tent is 48

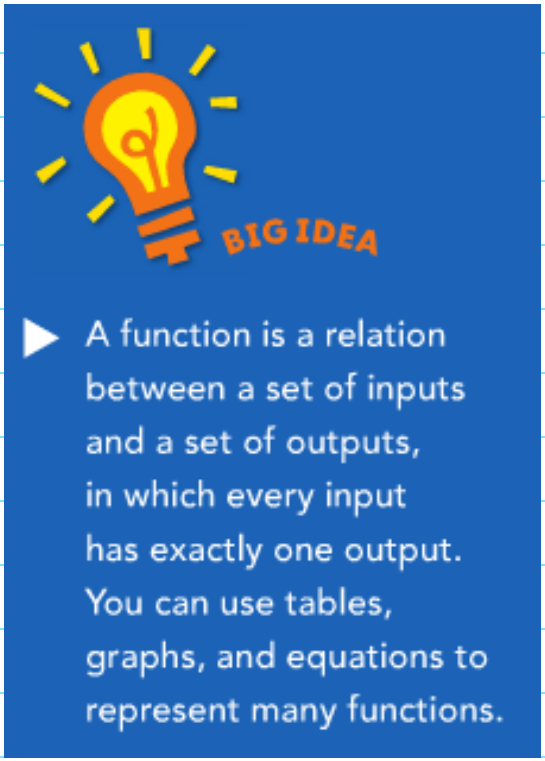


Lesson 6.1 Understanding Functions and Relationships Day 3

Objective

TSW understand that a function is…

***relation between set of inputs and outputs**



Common Core State Standards

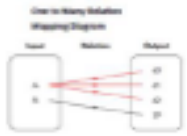
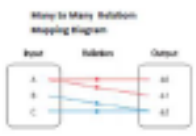
8F1 Understand that a function is a rule that assigns to each input exactly one output. 8F4 Construct a function to model a linear relationship between two quantities 8F5 Describe qualitatively the functional relationship between two quantities by analyzing a graph…

Mathematical Practices *MP1 Solve problems/persevere MP2 Reason MP 4 Model Mathematics*

Lesson 6.1 Under *TSW understand that a function is a relation between inputs and outputs.8F1*

DEFINITION	CHARACTERISTICS
Type of relation that assigns exactly one output to each input.	Mapping Diagram: If you can draw one to many OR many to many, then it is NOT a function. Graphically- If you can draw a vertical line through a graph that touches it more than once, then it is NOT a function We say "The relation didn't pass the vertical line test"

Function

EXAMPLES/MODELS	NON-EXAMPLES
  {(1,2),(2,2),(3,2),(4,2)}	  

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DEFINITION	
Type of relation that assigns exactly ___ output to each input.	M d C fu G If th n a V th

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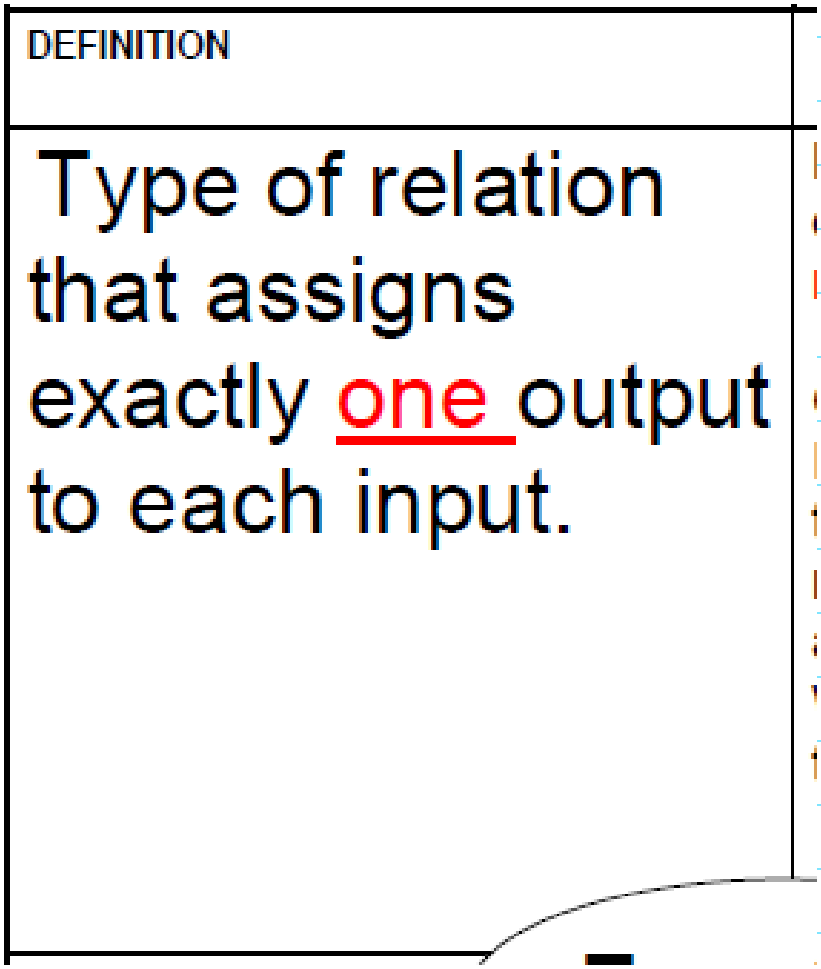

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CHARACTERISTICS
Mapping Diagram: If you can draw _____ OR_____, then it is NOT a function. Graphically- If you can draw a _____ through a graph that touches it more than once, then it is NOT a function We say “The relation didn’t pass the _____ line test”

Lesson 6.1 Understanding Functions and Relationships Day 3

CHARACTERISTICS
Mapping Diagram: If you can draw one to many OR many to many, then it is NOT a function. Graphically- If you can draw a vertical line through a graph that touches it more than once, then it is NOT a function We say "The relation didn't pass the vertical line test"

Lesson 6.1 Understanding Functions and Relationships Day 3

EXAMPLES/MODELS

x	y
1	4
2	7
3	8
4	-2

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

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EXAMPLES/MODELS

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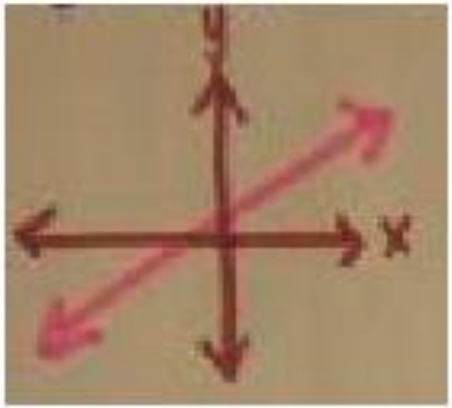

x	y
1	7
2	7
3	8
4	-2

{(1,2),(2,2),(3,2),(4,2)}

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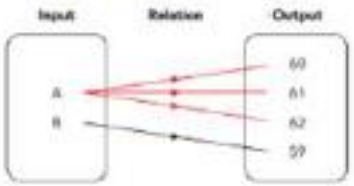
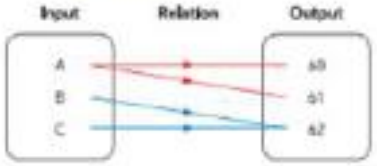
One to Many Relation
Mapping Diagram



Relation Consists of Ordered Pairs

{(A,60), (A, 61), (A, 62), (B, 59)}

Many to Many Relation
Mapping Diagram



Relation Consists of Ordered Pairs

{(A,60), (A, 61), (B, 62), (C, 62)}

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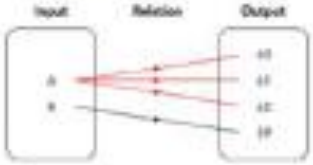
NON-EXAMPLES

One to Many Relation
Mapping Diagram



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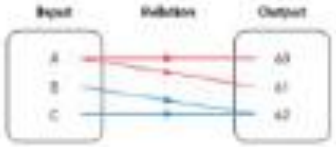
Many to Many Relation
Mapping Diagram



Relation Consists of Ordered Pairs

{(A,60), (A, 61), (B, 62), (C, 62)}

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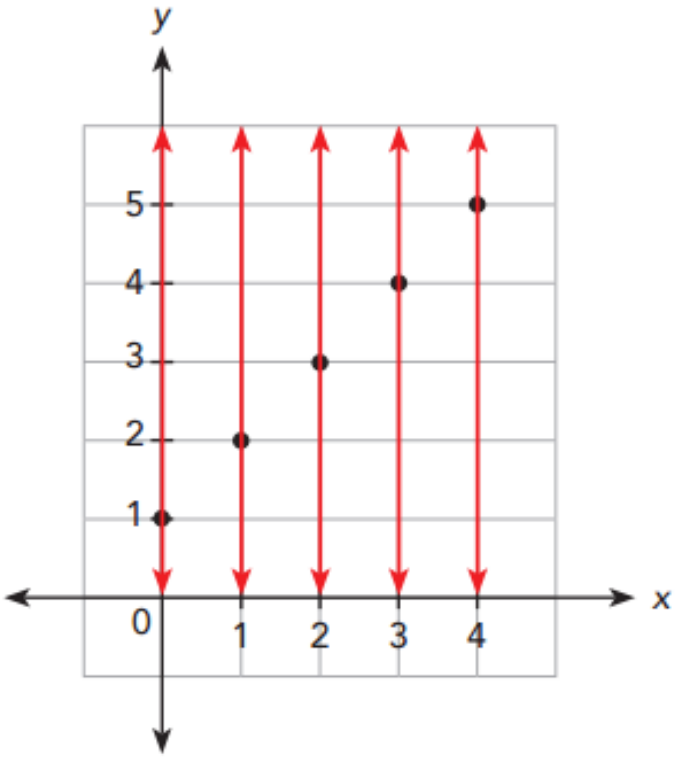
You can also represent this function using a graph by writing and graphing ordered pairs (input x, output y) as points on a coordinate plane. Notice that if you draw a vertical line through each point, each vertical line intersects exactly one point.



Vertical line test

If a relation is a function, then any vertical line drawn through a graph of the relation will always intersect the graph at exactly one point.

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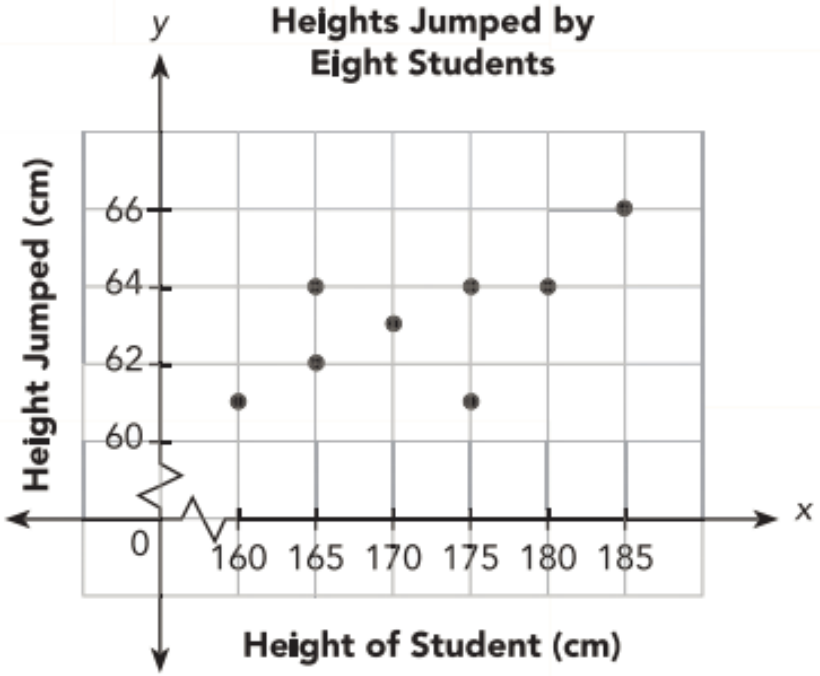
Example 3 **Tell whether a relation is a function from a graph.**

The graph shows the relation between the heights eight students can jump into the air, y centimeters, and the students' heights, x centimeters. Tell whether the relation represented by the graph is a function.



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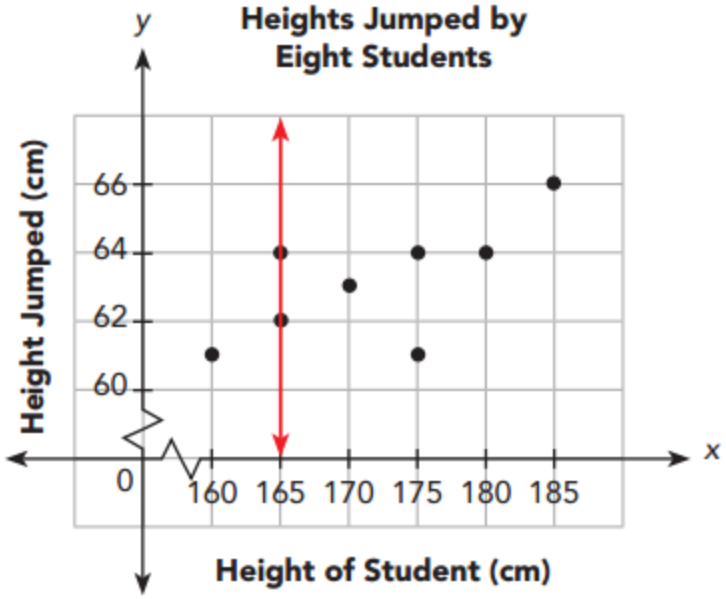
Solution



Think Math See margin.

One student who is 165 centimeters tall jumped 62 centimeters. How high did the other student who is also 165 centimeters tall jump? Are there any other students who have the same height who jumped different heights?

From the graph, there is at least one vertical line that intersects the graph at more than one point. Based on the vertical line test, the relation represented by the graph is not a function.

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Guided Practice

Tell whether the relation represented by each graph is a function. Explain.

7

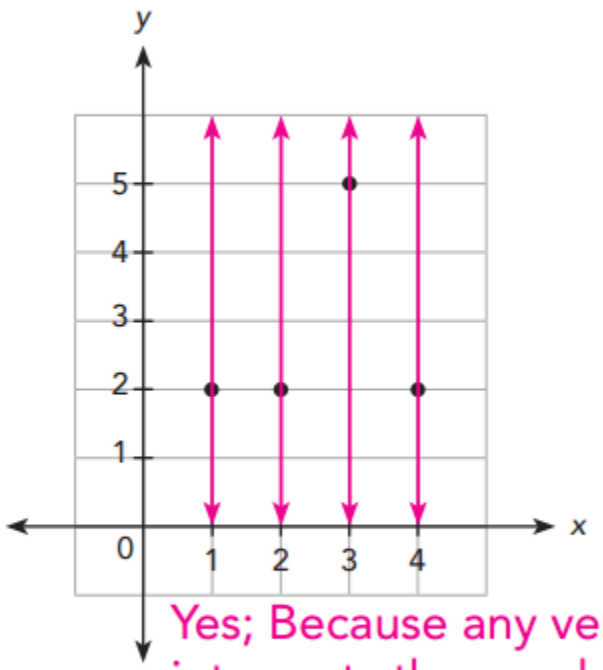
8

Lesson 6.1 Understanding Functions and Relationships Day 3

Guided Practice

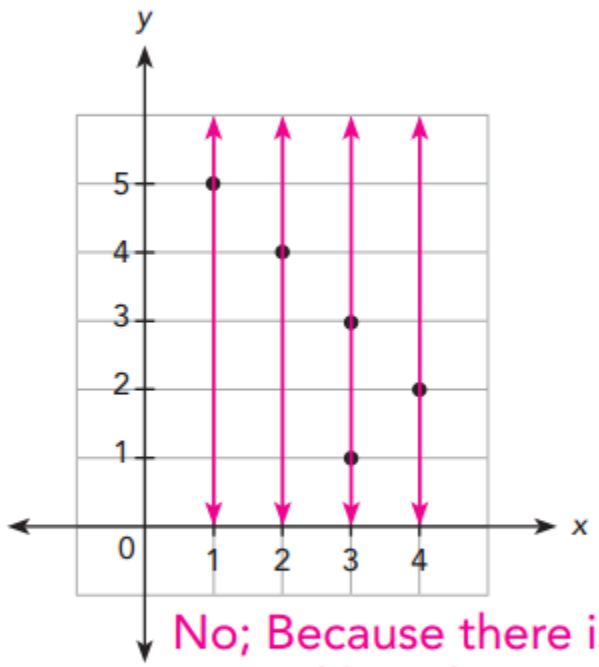
Tell whether the relation represented by each graph is a function. Explain.

7



Yes; Because any vertical line intersects the graph at exactly one point, it is a function.

8



No; Because there is one vertical line that intersects the graph at two points, it is not a function.

You can draw vertical

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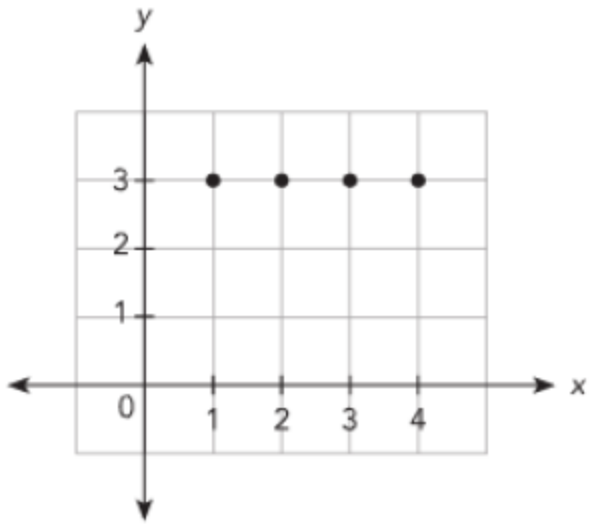
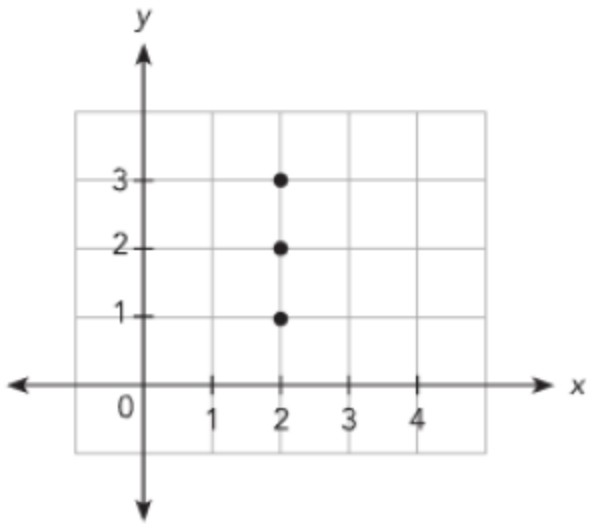
Tell whether the relation represented by each graph is a function. Explain.

16



17



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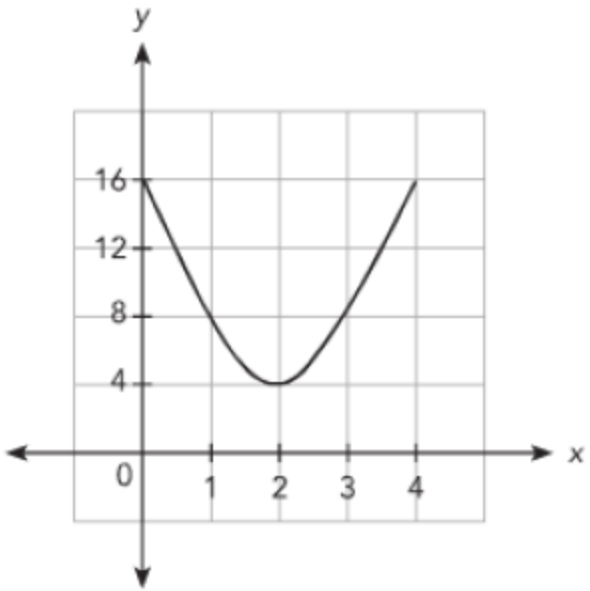

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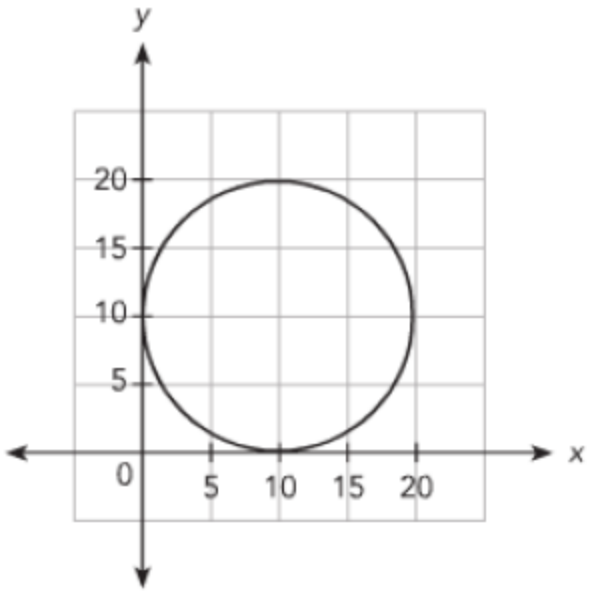

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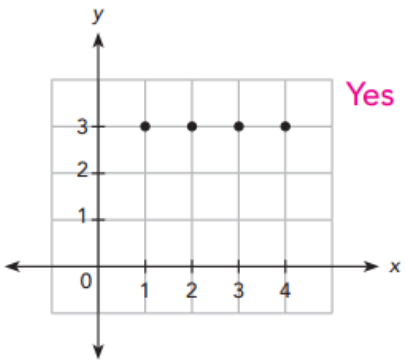
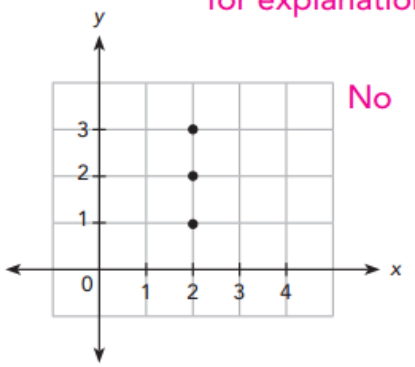
Tell whether the relation represented by each graph is a function. Explain. 16 – 19 See margin for explanations.

16



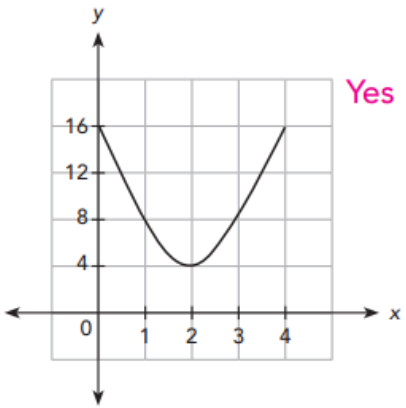
Yes

17



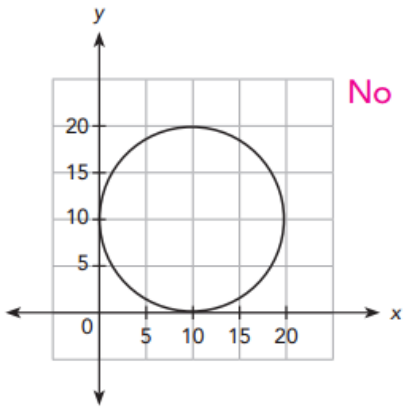
No

18



Yes

19



No

16 Because any vertical line only intersects the graph at exactly one point, it is a function.

17 Because a vertical line intersects the graph at more than one point, it is not a function.

18 Because any vertical line only intersects the graph at exactly one point, it is a function.

19 Because at least one vertical line intersects the graph at more than one point, it is not a function.

Caution

19 Some students might be confused as to how a closed shape such as a circle can be the

Lesson 6.1 Understanding Functions and Relationships Day 3

Tell whether each statement is True or False. Explain.

9. A function is a type of relation.

10. All relations are functions.

11. Only a many-to-one relation is a function.

12. A one-to-many relation is a function.

Lesson 6.1 Understanding Functions and Relationships Day 3

Tell whether each statement is True or False. Explain.

9. A function is a type of relation. True; A function is a type of relation that assigns exactly one output to each input.

10. All relations are functions. False; All functions are relations but not all relations are functions.

11. Only a many-to-one relation is a function. False; Many-to-one and one-to-one relations are functions because there is exactly one output for each input.

12. A one-to-many relation is a function. False; A one-to-many relation has at least one input with more than one output, but a function has exactly one output for each input.

Lesson 6.1 Understanding Functions and Relationships Day 3

20 The cost, y dollars, of some cheese that costs $3 per pound varies directly with the weight, x pounds, of the cheese. Use 1 unit on the horizontal axis to represent 1 pound for the x interval from 0 to 6, and 1 unit on the vertical axis to represent $3 for the y interval from 0 to 18.

Lesson 6.1 Understanding Functions and Relationships Day 3

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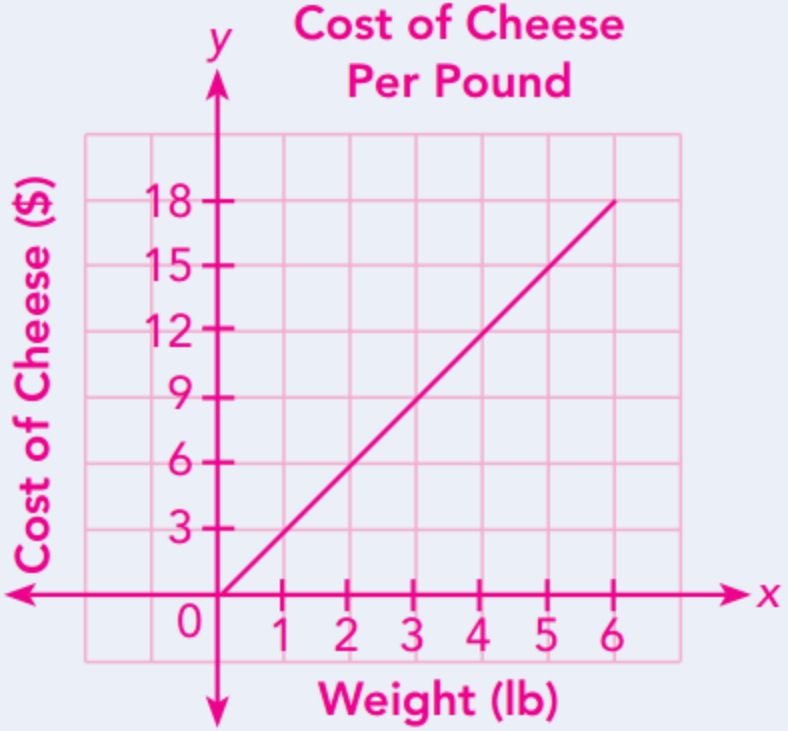
20

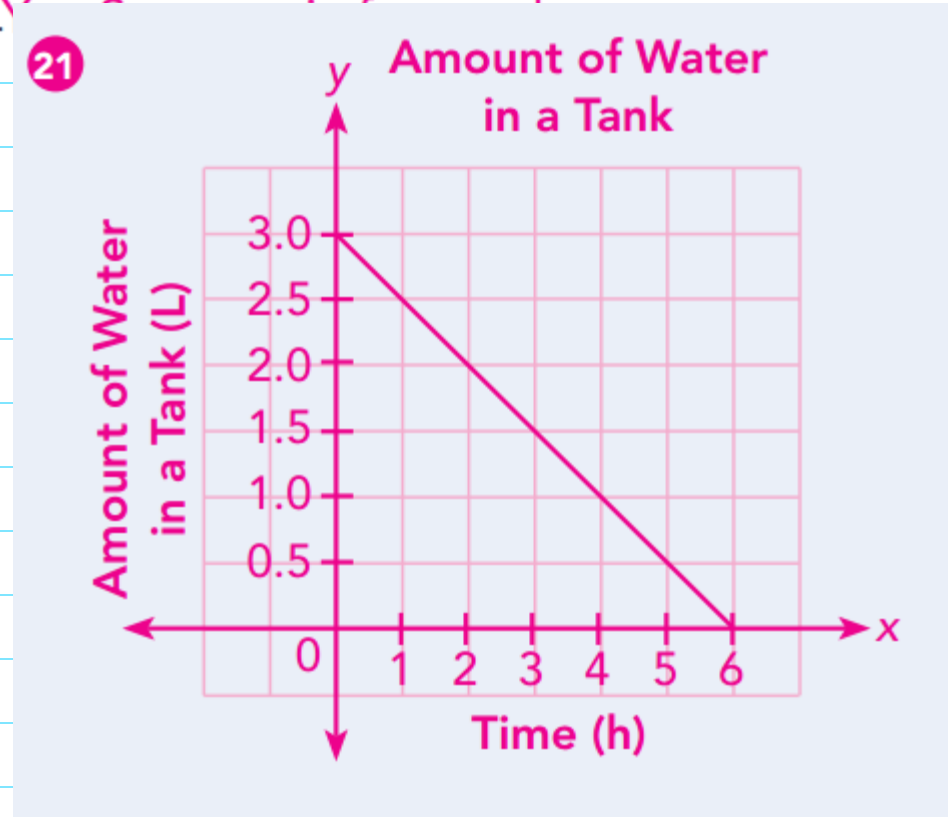


Lesson 6.1 Understanding Functions and Relationships Day 3

21 A tank contains 3 liters of water. The water in the tank is draining out at a rate of 0.5 liter per hour. Use 1 unit on the horizontal axis to represent 1 hour for the x interval from 0 to 6, and 1 unit on the vertical axis to represent 0.5 liter for the y interval from 0 to 3.0

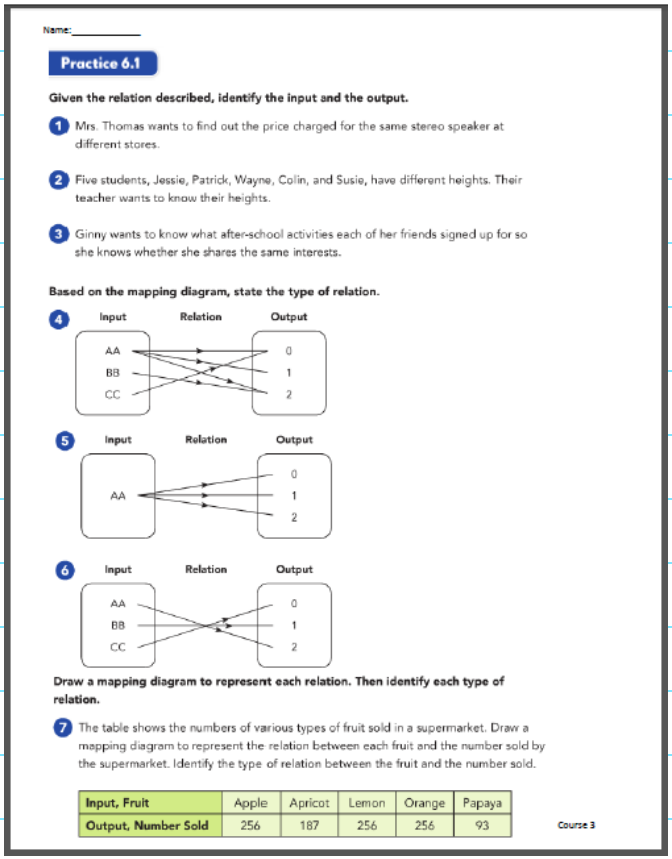
Lesson 6.1 Understanding Functions and Relationships Day 3

21 A tank contains 3 liters of water. The water in the tank is draining out at a rate of 0.5 liter per hour. Use 1 unit on the horizontal axis to represent 1 hour for the x interval from 0 to 6, and 1 unit on the vertical axis to represent 0.5 liter for the y interval from 0 to 3.0.



Lesson 6.1 Understanding Functions and Relationships Day 3

Practice 6.1 #16-22 and 24



Name:_____

Practice 6.1

Given the relation described, identify the input and the output.

1. Mrs. Thomas wants to find out the price charged for the same stereo speaker at different stores.
2. Five students, Jessie, Patrick, Wayne, Colin, and Susie, have different heights. Their teacher wants to know their heights.
3. Ginny wants to know what after-school activities each of her friends signed up for so she knows whether she shares the same interests.

Based on the mapping diagram, state the type of relation.

4. Input: AA, BB, CC — Relation — Output: 0, 1, 2

5. Input: AA — Relation — Output: 0, 1, 2

6. Input: AA, BB, CC — Relation — Output: 0, 1, 2

Draw a mapping diagram to represent each relation. Then identify each type of relation.

7. The table shows the numbers of various types of fruit sold in a supermarket. Draw a mapping diagram to represent the relation between each fruit and the number sold by the supermarket. Identify the type of relation between the fruit and the number sold.

Input, Fruit	Apple	Apricot	Lemon	Orange	Papaya
Output, Number Sold	256	187	256	256	93

Course 3

Challenge-

*Solve created equations

"Pick a Snowflake"

***#25-27 provide addition challenge**

*BuzzMath

Lesson Check #17 & 21– can tell whether a relation is a function from a graph

Lesson 6.1 Understanding Functions and Relationships Day 2

Ticket Out the Door- Connect, Extend, Challenge

1. How are the ideas and information presented CONNECTED to what you already knew?

2. What new ideas did you get that EXTENDED or pushed your thinking in new directions?

3. What is still CHALLENGING or confusing for you to get your mind around? What questions, wonderings or puzzles do you now have?