

A Story of Ratios[®]

Eureka Math[™]

Grade 8, Module 5

Student File_B

*Contains Exit Ticket
and Assessment Materials*

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Exit Ticket Packet

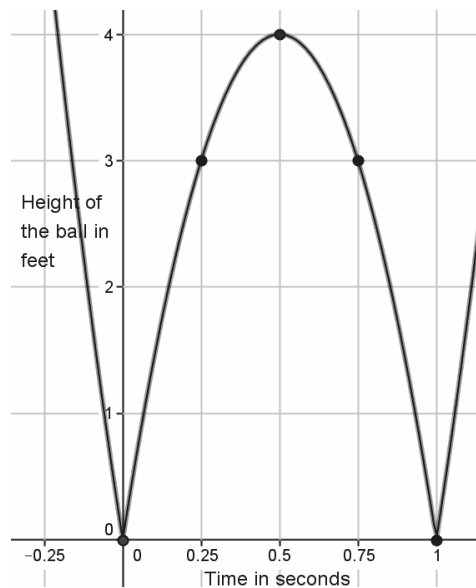
Name _____

Date _____

Lesson 1: The Concept of a Function

Exit Ticket

A ball is bouncing across the school yard. It hits the ground at $(0,0)$ and bounces up and lands at $(1,0)$ and bounces again. The graph shows only one bounce.



- Identify the height of the ball at the following values of t : 0, 0.25, 0.5, 0.75, 1.
- What is the average speed of the ball over the first 0.25 seconds? What is the average speed of the ball over the next 0.25 seconds (from 0.25 to 0.5 seconds)?
- Is the height of the ball changing at a constant rate?

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Lesson 2: Formal Definition of a Function

Exit Ticket

1. Can the table shown below represent values of a function? Explain.

Input (x)	10	20	30	40	50
Output (y)	32	64	96	64	32

2. Kelly can tune 4 cars in 3 hours. If we assume he works at a constant rate, we can describe the situation using a function.
- a. Write the function that represents Kelly's constant rate of work.

- b. Use the function you wrote in part (a) as the formula for the function to complete the table below. Round your answers to the hundredths place.

Time spent tuning cars (x)	2	3	4	6	7
Number of cars tuned up (y)					

- c. Kelly works 8 hours per day. According to this work, how many cars will he finish tuning at the end of a shift?
- d. For this problem, we assumed that Kelly worked at a constant rate. Do you think that is a reasonable assumption for this situation? Explain.

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Lesson 3: Linear Functions and Proportionality

Exit Ticket

The information in the table shows the number of pages a student can read in a certain book as a function of time in minutes spent reading. Assume a constant rate of reading.

Time in minutes (x)	2	6	11	20
Total number of pages read in a certain book (y)	7	21	38.5	70

- Write the equation that describes the total number of pages read, y , as a linear function of the number of minutes, x , spent reading.
- How many pages can be read in 45 minutes?
- A certain book has 396 pages. The student has already read $\frac{3}{8}$ of the pages and now picks up the book again at time $x = 0$ minutes. Write the equation that describes the total number of pages of the book read as a function of the number of minutes of further reading.
- Approximately how much time, in minutes, will it take to finish reading the book?

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Lesson 4: More Examples of Functions

Exit Ticket

1. The table below shows the costs of purchasing certain numbers of tablets. We can assume that the total cost is a linear function of the number of tablets purchased.

Number of tablets (x)	17	22	25
Total cost in dollars (y)	10,183.00	13,178.00	14,975.00

- a. Write an equation that describes the total cost, y , as a linear function of the number, x , of tablets purchased.
- b. Is the function discrete? Explain.
- c. What number does the function assign to 7? Explain.
2. A function C assigns to each word in the English language the number of letters in that word. For example, C assigns the number 6 to the word *action*.
- a. Give an example of an input to which C would assign the value 3.
- b. Is C a discrete function? Explain.

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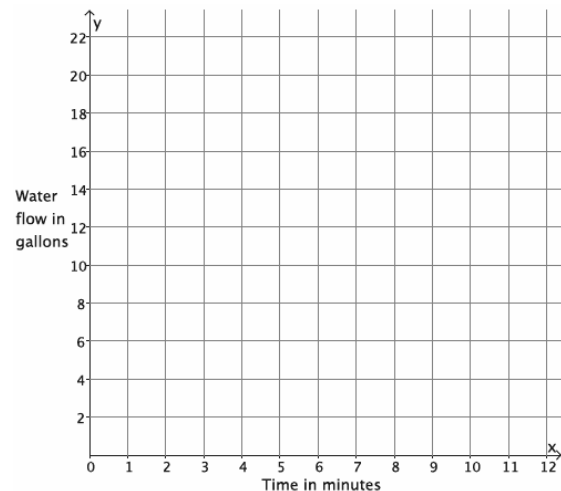
Lesson 5: Graphs of Functions and Equations

Exit Ticket

Water flows from a hose at a constant rate of 11 gallons every 4 minutes. The total amount of water that flows from the hose is a function of the number of minutes you are observing the hose.

- Write an equation in two variables that describes the amount of water, y , in gallons, that flows from the hose as a function of the number of minutes, x , you observe it.
- Use the equation you wrote in part (a) to determine the amount of water that flows from the hose during an 8-minute period, a 4-minute period, and a 2-minute period.

- An input of the function, x , is time in minutes, and the output of the function, y , is the amount of water that flows out of the hose in gallons. Write the inputs and outputs from part (b) as ordered pairs, and plot them as points on the coordinate plane.



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Lesson 6: Graphs of Linear Functions and Rate of Change

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1. Sylvie claims that a function with the table of inputs and outputs below is a linear function. Is she correct? Explain.

Input	Output
-3	-25
2	10
5	31
8	54

2. A function assigns the inputs and corresponding outputs shown in the table to the right.
- a. Does the function appear to be linear? Check at least three pairs of inputs and their corresponding outputs.

Input	Output
-2	3
8	-2
10	-3
20	-8

b. Can you write a linear equation that describes the function?

c. What will the graph of the function look like? Explain.

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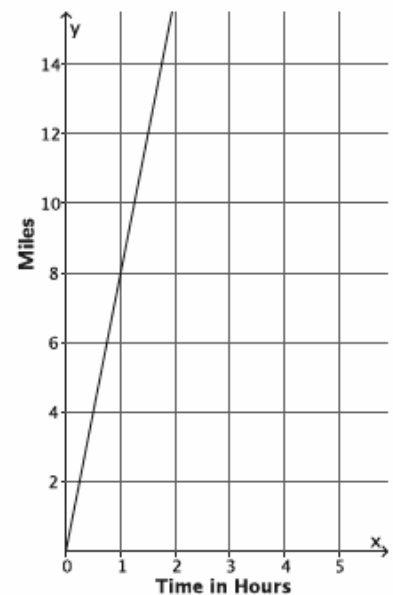
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Lesson 7: Comparing Linear Functions and Graphs

Exit Ticket

Brothers Paul and Pete walk 2 miles to school from home. Paul can walk to school in 24 minutes. Pete has slept in again and needs to run to school. Paul walks at a constant rate, and Pete runs at a constant rate. The graph of the function that represents Pete's run is shown below.

- a. Which brother is moving at a greater rate? Explain how you know.



- b. If Pete leaves 5 minutes after Paul, will he catch up to Paul before they get to school?

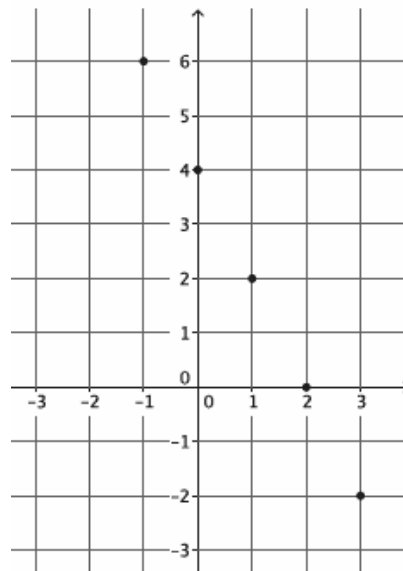
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Lesson 8: Graphs of Simple Nonlinear Functions

Exit Ticket

1. The graph below is the graph of a function. Do you think the function is linear or nonlinear? Briefly justify your answer.



2. Consider the function that assigns to each number x the value $\frac{1}{2}x^2$. Do you expect the graph of this function to be a straight line? Briefly justify your answer.

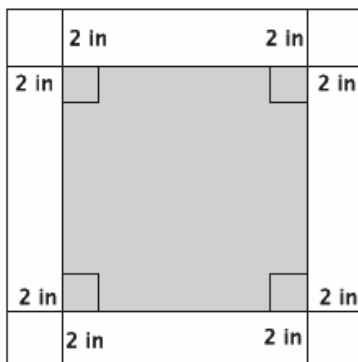
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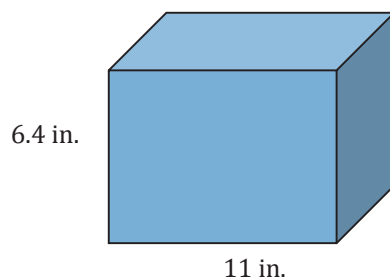
Lesson 9: Examples of Functions from Geometry

Exit Ticket

- Write a function that would allow you to calculate the area in square inches, A , of a 2-inch white border for any sized square figure with sides of length s measured in inches.



- The volume of the rectangular prism is 295.68 in^3 . What is its width?



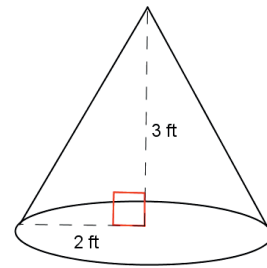
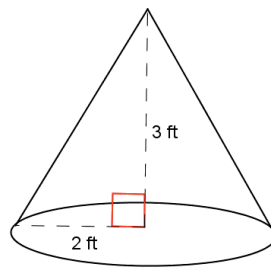
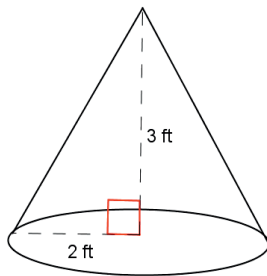
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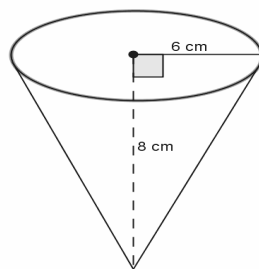
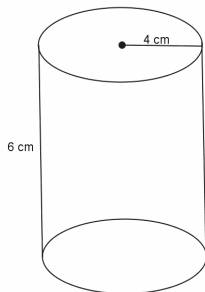
Lesson 10: Volumes of Familiar Solids—Cones and Cylinders

Exit Ticket

1. Use the diagram to find the total volume of the three cones shown below.



2. Use the diagram below to determine which has the greater volume, the cone or the cylinder.



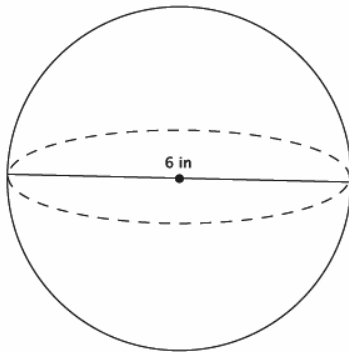
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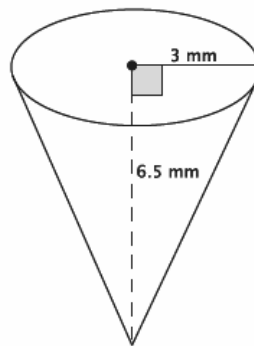
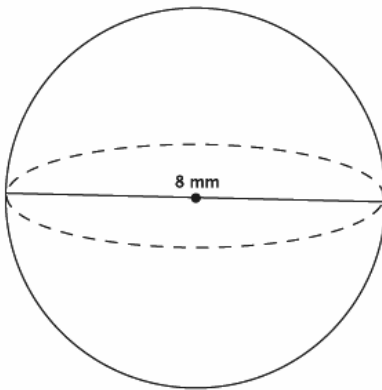
Lesson 11: Volume of a Sphere

Exit Ticket

1. What is the volume of the sphere shown below?



2. Which of the two figures below has the greater volume?



Assessment Packet

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1.

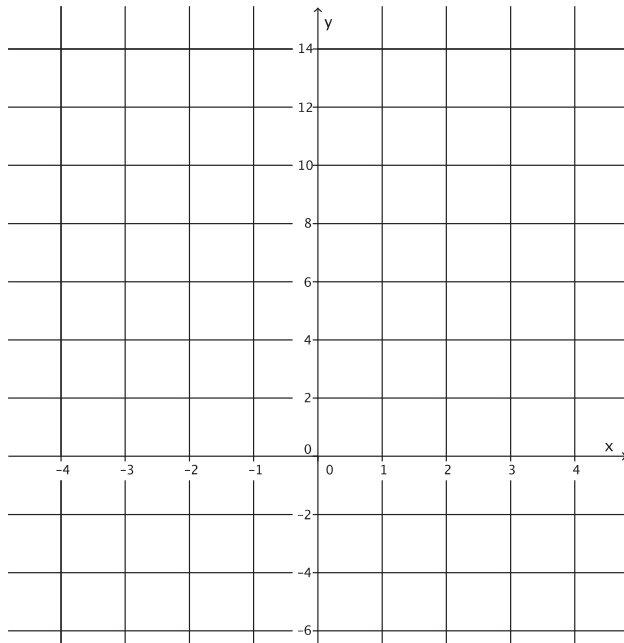
- a. We define x as a year between 2008 and 2013 and y as the total number of smartphones sold that year, in millions. The table shows values of x and corresponding y values.

Year (x)	2008	2009	2010	2011	2012	2013
Number of smartphones in millions (y)	3.7	17.3	42.4	90	125	153.2

- i. How many smartphones were sold in 2009?
- ii. In which year were 90 million smartphones sold?
- iii. Is y a function of x ? Explain why or why not.
- b. Randy began completing the table below to represent a particular linear function. Write an equation to represent the function he was using and complete the table for him.

Input (x)	-3	-1	0	$\frac{1}{2}$	1	2	3
Output (y)	-5		4				13

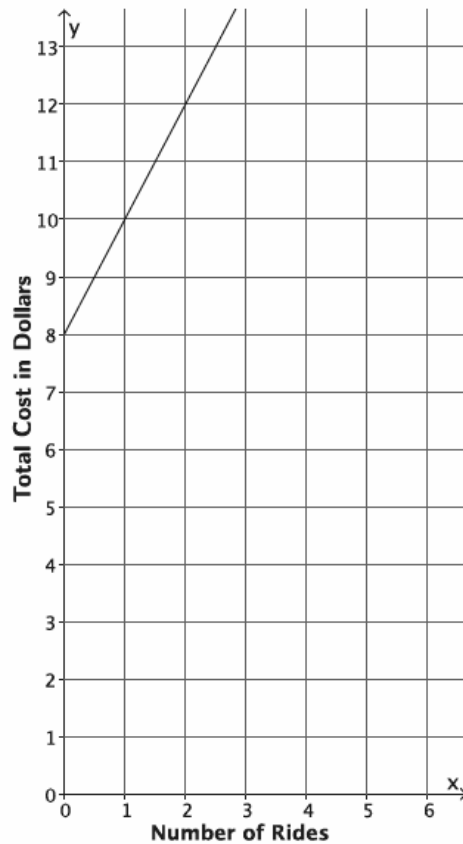
- c. Create the graph of the function in part (b).



- d. At NYU in 2013, the cost of the weekly meal plan options could be described as a function of the number of meals. Is the cost of the meal plan a linear or nonlinear function? Explain.

8 meals: \$125/week
10 meals: \$135/week
12 meals: \$155/week
21 meals: \$220/week

2. The cost to enter and go on rides at a local water park, Wally's Water World, is shown in the graph below.



A new water park, Tony's Tidal Takeover, just opened. You have not heard anything specific about how much it costs to go to this park, but some of your friends have told you what they spent. The information is organized in the table below.

Number of rides	0	2	4	6
Dollars spent	12.00	13.50	15.00	16.50

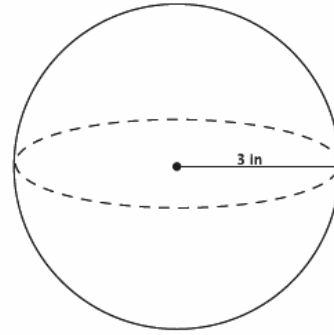
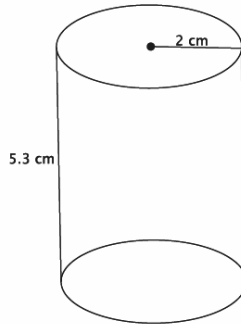
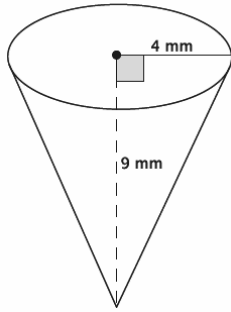
Each park charges a different admission fee and a different fee per ride, but the cost of each ride remains the same.

- a. If you only have \$14 to spend, which park would you attend (assume the rides are the same quality)? Explain.

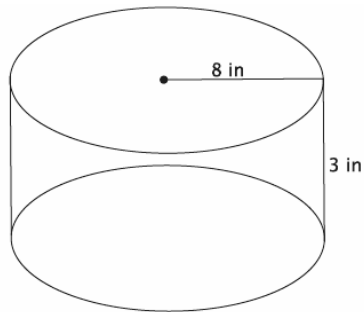
- b. Another water park, Splash, opens, and they charge an admission fee of \$30 with no additional fee for rides. At what number of rides does it become more expensive to go to Wally's Water World than Splash? At what number of rides does it become more expensive to go to Tony's Tidal Takeover than Splash?
- c. For all three water parks, the cost is a function of the number of rides. Compare the functions for all three water parks in terms of their rate of change. Describe the impact it has on the total cost of attending each park.

3. For each part below, leave your answers in terms of π .

a. Determine the volume for each three-dimensional figure shown below.



b. You want to fill the cylinder shown below with water. All you have is a container shaped like a cone with a radius of 3 inches and a height of 5 inches; you can use this cone-shaped container to take water from a faucet and fill the cylinder. How many cones will it take to fill the cylinder?



- c. You have a cylinder with a diameter of 15 inches and height of 12 inches. What is the volume of the largest sphere that will fit inside of it?

