

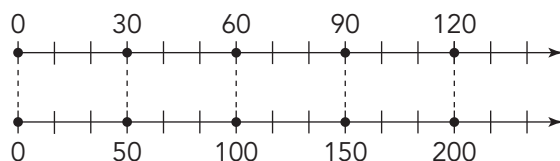
One Is Not Enough

6

Using and Comparing Ratio Representations

WARM UP

1. Use the double number line to create a ratio table.



x					
y					

2. Create a scenario that fits the data on the double number line and ratio table. What ratio is associated with your scenario?

LEARNING GOALS

- Use graphs to compare ratios.
- Read and interpret ratios from graphs, double number lines, and tables.
- Use ratio and rate reasoning and multiple ratio models to solve problems.
- Compare representations of additive and multiplicative relationships.

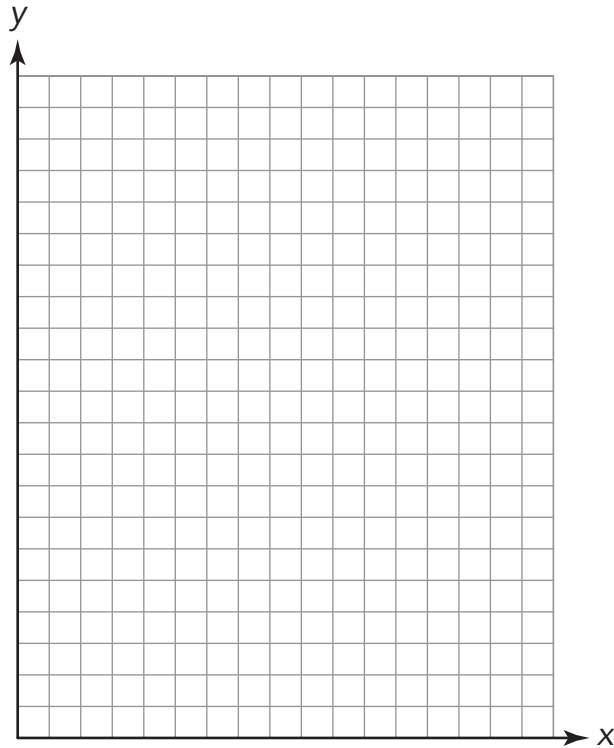
You have used a variety of tools to determine equivalent ratios. How can you compare the different representations as you solve ratio problems?

Getting Started

Just-Right Ratios

Yana's dad is trying to make his own bread. But each time he tries, the bread is either too dry because it has too much flour or too runny because it has too much water.

Flour (cups)	Water (cups)	Dry / Runny
11	4	dry
3	5	runny
6	2	dry
10	9	runny
8	8	runny
10	4	dry
10	5	dry
12	9	runny
15	8	dry
5	4	runny



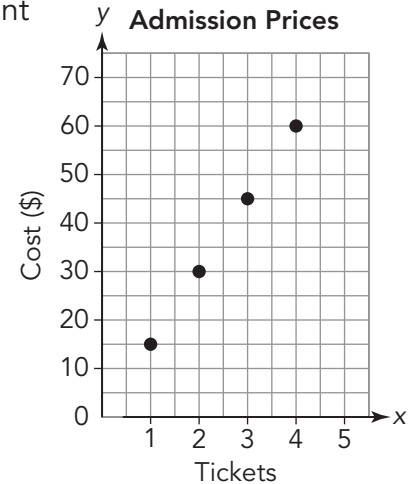
1. Use Xs to graph each attempt that was too dry. Use Os to graph attempts that were too runny.
2. Estimate a ratio that is "just right" and graph the ratio. Explain your reasoning.
3. Compare your graph with your classmates' graphs. Did you all create the same graphs?



The adult ticket price for admission into the Rollerville Amusement Park is \$15. The table and graph show the ratio *number of adult tickets* : *cost*.

Adult Tickets	1	2	3	4
Cost (\$)	15	30	45	60

The Rollerville Amusement Park has different charges for students and pre-school age children. Student tickets are \$10. Pre-school age children tickets are \$5.



1. Complete each table.

Student Tickets	1	2	3	4
Cost (\$)				

Pre-School Tickets	1	2	3	4
Cost (\$)				

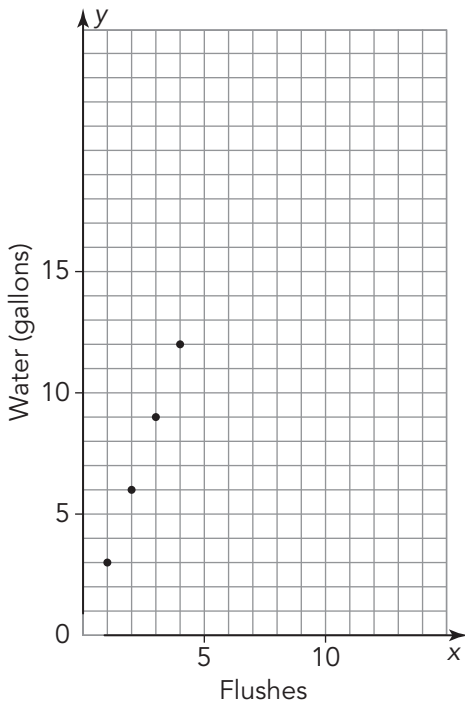
- Plot each set of equivalent ratios on the graph. Use a Δ for the *student tickets* : *cost* ratios and a \square for *pre-school tickets* : *cost* ratios.
- Draw three separate lines through the points that represent each ratio. What do you notice?
- Do all the points on the line you drew make sense in this problem situation? Why or why not?
- How can you tell by looking at the three lines which cost to ticket ratio is the highest and the lowest?

ACTIVITY
6.2

Choosing a Strategy to Solve Ratio Problems



You know different ways to think about ratios. So, you can use different strategies to solve problems.



1. The graph shown represents the number of gallons of water used for the number of times a toilet is flushed.

a. Write each point on the graph as the ratio of gallons of water used : number of flushes.

b. What do you notice about each ratio?

How do you know this graph represents equivalent ratios?



c. How many gallons of water would be used if the toilet was flushed 8 times? Explain the method you used.

d. How many times would the toilet be flushed to use 18 gallons of water? Explain the method you used.

e. Did you use the same method to answer each question? If not, why?

2. The graph shown represents the number of gallons of water used for the number of loads of laundry washed.

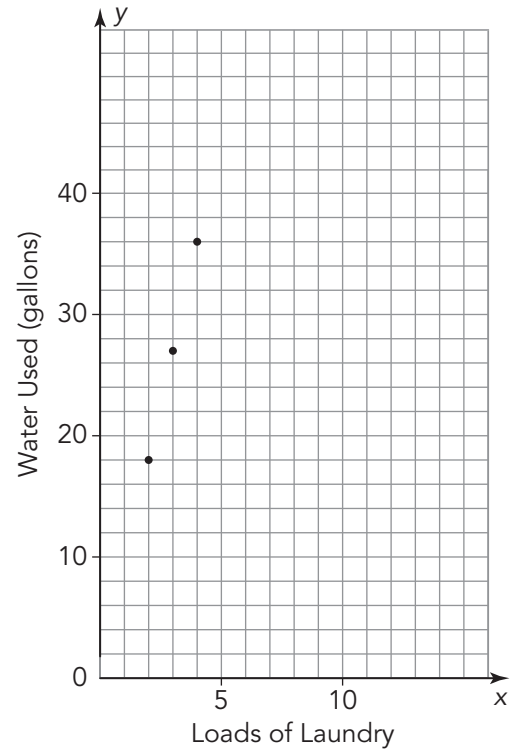
a. Write each point on the graph as the ratio of *gallons of water used* : *number of loads of laundry*.

b. What do you notice about each ratio?

c. How many gallons of water would be used for 7 loads of laundry? Explain the method you used.

d. How many loads of laundry can be done if 45 gallons of water are used? Explain the method you used.

e. Did you use the same method to answer each question? If not, why?



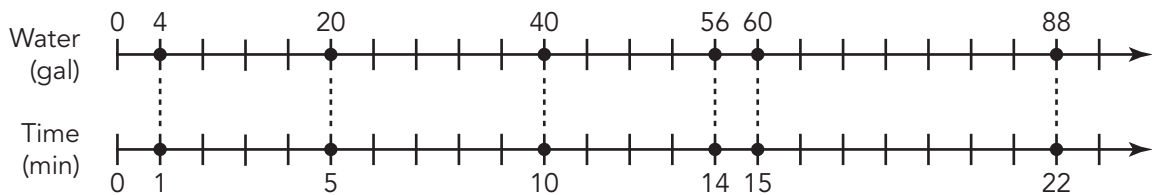
ACTIVITY
6.3

Comparing Ratios with Double Number Lines

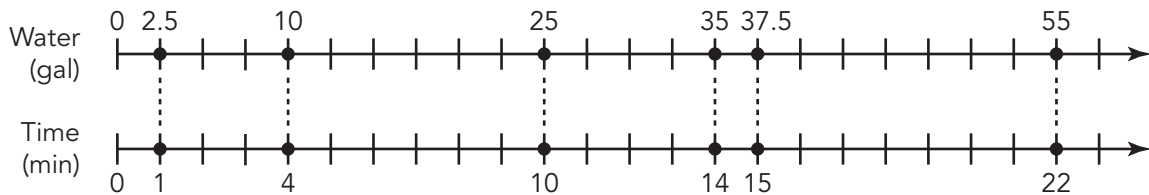


Showerheads come in various styles and allow different rates of water to flow. The ratio *gallons of water* : *time* is given for three different showerhead models.

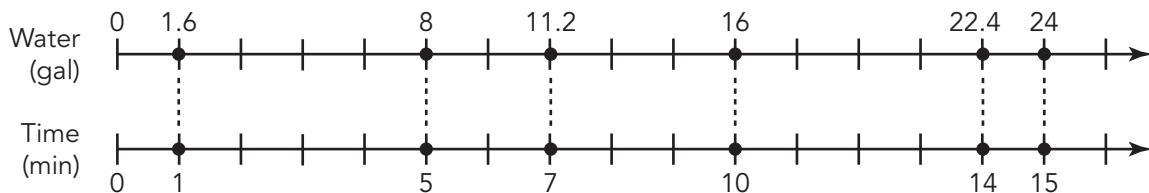
The first showerhead uses 20 gallons of water for every 5 minutes.



A second showerhead model uses 25 gallons of water for every 10 minutes.



A third showerhead model uses 8 gallons of water for every 5 minutes.



1. Which of the three showerheads used the least amount of water per minute?
2. Explain your reasoning using double number lines.

ACTIVITY
6.4

Additive and Multiplicative Representations



NOTES

Two different jogging situations are given on the next two pages, along with a diagram showing the current relationship between the joggers.

1. At the end of the lesson, there are diagrams, equations, graphs, and verbal statements that each match one of the situations. Cut them out and tape them in their appropriate location. Then explain why each representation describes that relationship between the two joggers.

a. Choose the diagram that shows the relationship between the joggers after 5 minutes.

b. Choose the equation that represents the relationship between the two joggers.

c. Choose the graph that models the relationship between the two joggers.

d. Choose the type of relationship that exists between the two joggers.

Two joggers are running at the same speed.

Diagram of the current position of the two joggers.

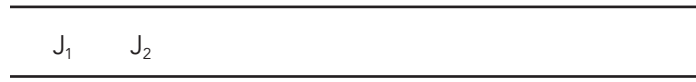


Diagram of the two joggers after 5 minutes.

Explanation:

Equation

Explanation:

Graph

Explanation:

Verbal Statement

Explanation:

Jogger 2 runs twice as fast as Jogger 1.

Diagram of the current position of the two joggers

J_1 J_2

Diagram of the two joggers after 5 minutes.

Explanation:

Equation

Explanation:

Graph

Explanation:

Verbal Statement

Explanation:

TALK the TALK

In Goes the Kitchen Sink

You are given the ratio *6 red marbles : 9 blue marbles*. For each model in the graphic organizer, write two ratios equivalent to the given ratio: one with numbers larger than the given and one with numbers smaller than the given. Show how you can use each model to determine the equivalent ratios.

SCALE UP/
SCALE DOWN

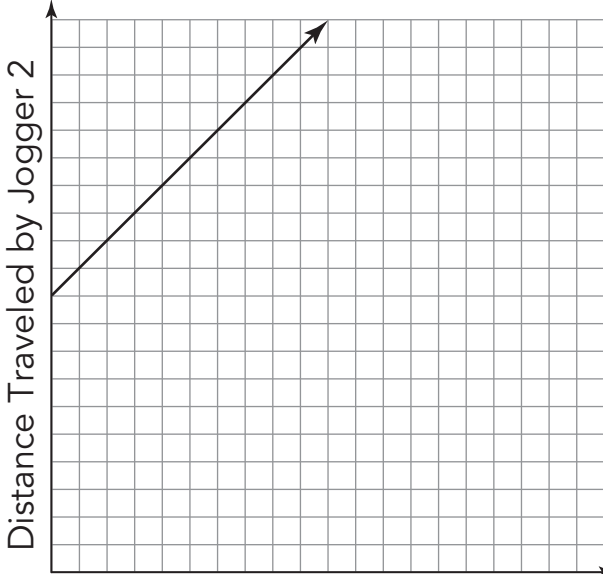
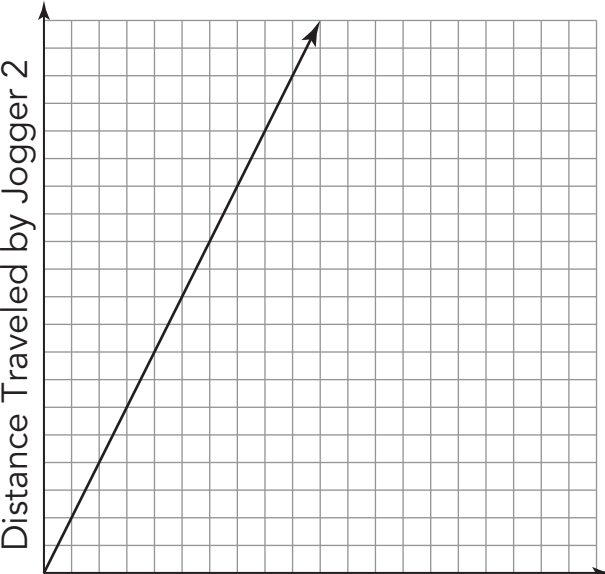
TABLE

6 red marbles :
9 blue marbles

DOUBLE NUMBER
LINES

GRAPH

Cut Out for Activity 6.4

<p>✂</p> <p>J_1 J_2</p> <p>✂</p>	
<p>✂</p> <p>J_1 J_2</p> <p>✂</p>	
<p>✂</p> <p>$J_2 = J_1 + 10$</p> <p>✂</p>	<p>$J_2 = 2 J_1$</p> <p>✂</p>
<p>✂</p>  <p>Distance Traveled by Jogger 2</p> <p>Distance Traveled by Jogger 1</p> <p>✂</p>	 <p>Distance Traveled by Jogger 2</p> <p>Distance Traveled by Jogger 1</p> <p>✂</p>
<p>✂</p> <p>Ratio Relationship</p> <p>✂</p>	<p>Additive Relationship</p> <p>✂</p>

Assignment

Write

Describe the advantages and disadvantages of using double number lines, tape diagrams, equations, tables, and graphs to write, represent, and compare ratios.

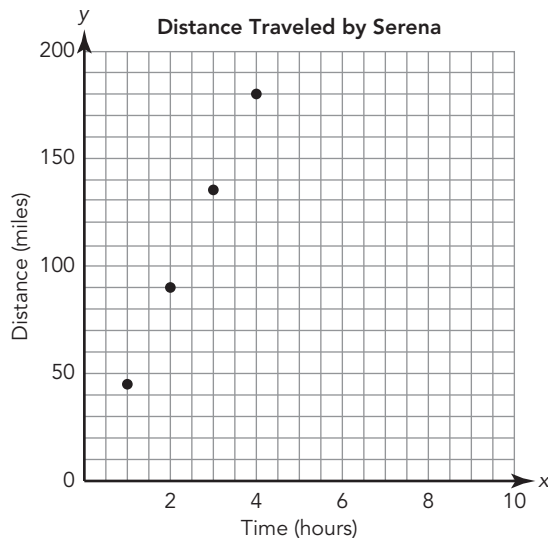
Remember

You can use a number of different models, like graphs, tables, double number lines, and tape diagrams to analyze ratios and ratio relationships and to solve problems.

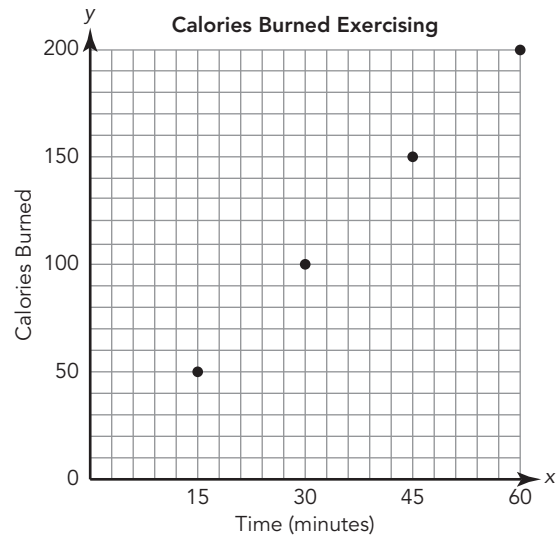
Practice

1. Use a graph to answer each question.

- a. Serena is driving to the mountains for a summer camping trip. She is traveling at a constant rate of 45 miles per hour. The graph shows the ratio $time : distance$. How far has Serena traveled after 4 hours?



- b. Cisco is exercising. The graph shows the ratio $calories\ burned : time$ for Cisco. How many calories did Cisco burn in 30 minutes?



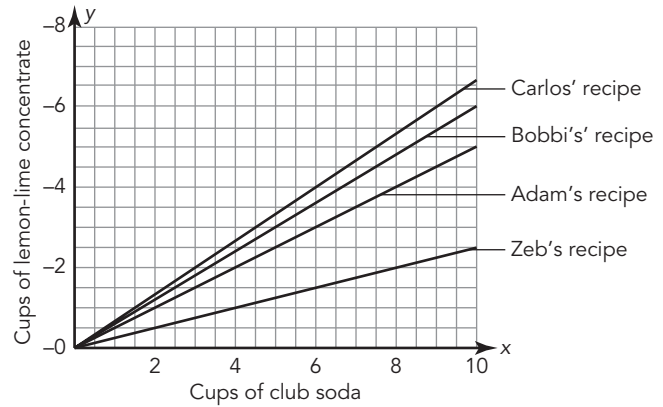
2. A recipe calls for 2 eggs for every 5 cups of milk. How many eggs were used if 20 cups of milk were used? Draw a double number line to answer the question.

3. Alberto is in charge of making lunch at a summer camp. He knows that 3 tuna casseroles will serve 15 campers. How many tuna casseroles should Alberto make to serve 35 campers?

Casseroles	1	3		
Campers		15	30	35

Stretch

Four recipes for lemon-lime punch are represented on the graph shown. Which recipe has the strongest taste of lemon-lime? Which recipe has the weakest taste of lemon-lime? Use the graph to explain your answer.



Review

- Morgan and her friends are testing their typing skills. Morgan took an online typing test to compare her typing speed with her friends' speeds. During the 2 minute test, she typed 144 words. Her friend, Elizabeth, took a longer test; she typed 150 words in 3 minutes. Their other friend, Ruth, typed 65 words in 1 minute.
 - Create a ratio table to show each girl's typing speed for 1 through 6 minutes.
 - Plot each set of equivalent ratios on a coordinate plane. Use \times to denote Morgan's typing speed, \square to denote Elizabeth's typing speed, and \star to denote Ruth's typing speed.
 - Draw three separate lines through the points that represent each ratio. What do you notice?
 - Who is the fastest typist? Who is the slowest typist? Explain how you can tell by looking at the three lines on your graph.
- Morgan uses her typing skills to write a research paper for her history class. When she hits "Print," she realizes that her printer is broken—for every 5 pages she attempts to print, the printer messes up 3 of them! Create a ratio table to display the number of pages her printer would mess up. Then create a graph for your table of values. Be sure to label the axes and title the graph.
- Determine the surface area of each figure based on the measurements of its net.
 -
 -