First 5 Minutes — Review Question

GRADE 6 • TOPIC 5 • LESSON 5.4 | 5 points • Work independently

Lesson 5.4 • Represent and Graph Ratios

Complete 3:7 = 9:□.

1. Show each step in your notebook.
2. Explain the operation or rule you used.

Real-Life Connection & Key Concepts

Essential question

How can tables and graphs show equivalent ratios?

Solve & Discuss It!

For every 4 adults at the beach, there are 3 children. Find the numbers of children for 8, 12, 16 and 20 adults. Make a table and graph the relationship.

What we will learn

Create ratio tables, plot ordered pairs, interpret the origin and compare graphed ratios.

Definitions & rules

An ordered pair (x, y) records corresponding values.

Equivalent ratios produce points on a straight line through (0, 0) when graphed with a consistent scale.

Label axes with quantities and units.

Example 1 — Represent and Graph Ratios

GRADE 6 • TOPIC 5 • LESSON 5.4 | Guided example • Model and explain

Problem

Jake’s Party Store sells 3 balloons for $2. Make a table for 3, 6, 9 and 12 balloons. Plot the ordered pairs; use the graph to find the cost of 18 balloons.

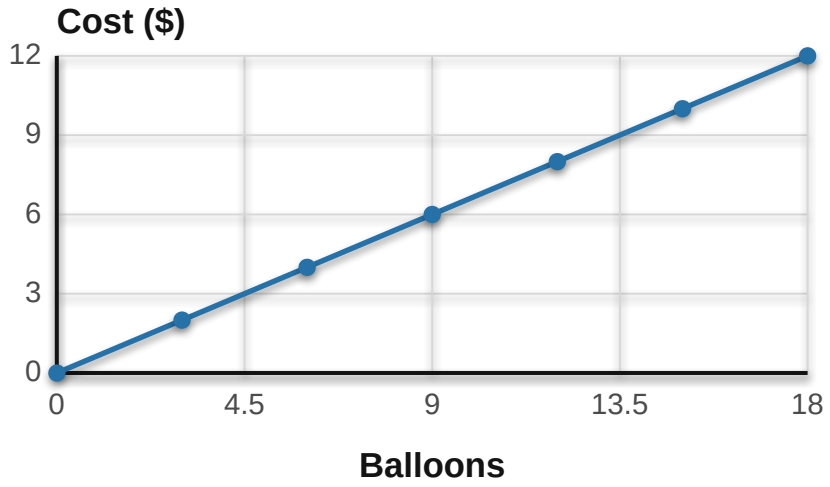
Worked solution

Pairs: (3,2), (6,4), (9,6), (12,8).

The line passes through the origin.

(18,12) means 18 balloons cost $12.

Scale both quantities equally; plot ordered pairs with labeled axes.



Example 2 — Represent and Graph Ratios

GRADE 6 • TOPIC 5 • LESSON 5.4 | Guided example • Model and explain

Problem

Jack’s juice recipe uses 5 celery sticks and 2 apples. He has 25 celery sticks. How many apples will he need? Use a table and graph.

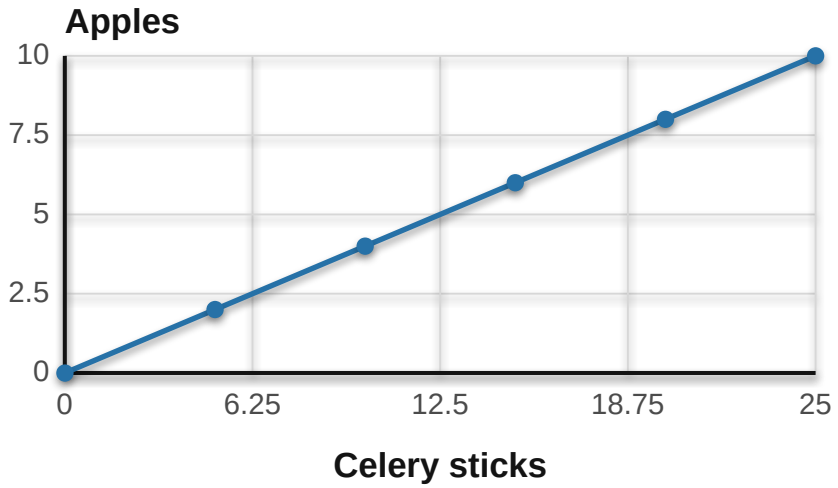
Worked solution

Add 5 celery sticks and 2 apples in each row.

(5,2), (10,4), (15,6), (20,8), (25,10).

Jack needs 10 apples.

Scale both quantities equally; plot ordered pairs with labeled axes.



Example 3 — Represent and Graph Ratios

GRADE 6 • TOPIC 5 • LESSON 5.4 | Guided example • Model and explain

Problem

The diameter/circumference pairs (in inches) for a fruit plate, clock face and hula hoop are (7,22), (14,44), (35,110). What do you notice when you graph them?

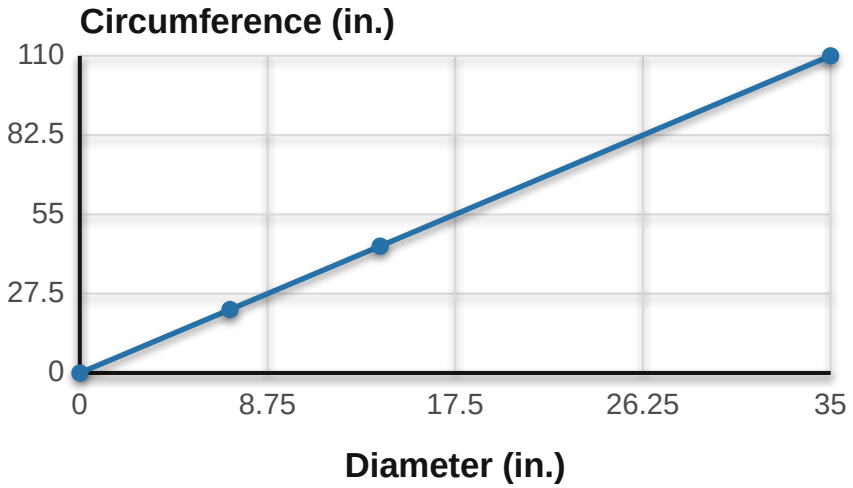
Worked solution

$\frac{22}{7} = \frac{44}{14} = \frac{110}{35}$.

The points lie on the same line through the origin.

The ratio C/d is approximately π.

Scale both quantities equally; plot ordered pairs with labeled axes.



Individual Work

GRADE 6 • TOPIC 5 • LESSON 5.4 | 10 minutes total • 10 points

Complete all five tasks. Show your reasoning.

6. (p. 289) Complete the ratio table with pairs (2,3), (4,6), and another equivalent pair. Plot the points.

7. (p. 289) Complete the table (5,2), (25,10), and another equivalent pair. Plot the points.

8a. (p. 289) A student runs 2 minutes for every 10 minutes she walks. Complete the table (2,10), (4,20), and a third pair. Graph the pairs (x = running, y = walking).

Individual Work — continued

GRADE 6 • TOPIC 5 • LESSON 5.4 | 10 minutes total • 10 points

Finish the remaining problems. Check your work.

8b. (p. 289) Using the same relationship, how many minutes does someone walk if they run 7 minutes?

9. (p. 289) Car A travels $\frac{200 \text{ mi}}{8 \text{ gal}}$; B $\frac{140 \text{ mi}}{5 \text{ gal}}$; C $\frac{81 \text{ mi}}{3 \text{ gal}}$. Find each unit rate and the best mileage.

Individual Work — Answer Key

GRADE 6 • TOPIC 5 • LESSON 5.4 | Check your answers

Scale both quantities equally; plot ordered pairs with labeled axes.

6. (p. 289)

Example third row: 6, 9. Plot (2,3), (4,6), (6,9); y = 1.5x.

7. (p. 289)

Example third row: 40, 16. Plot (5,2), (25,10), (40,16); y = 0.4x.

8a. (p. 289)

Example third row: 6, 30. Plot (2,10), (4,20), (6,30); walking = 5 × running.

8b. (p. 289)

7 × 5 = 35 minutes walking.

9. (p. 289)

A: $\frac{200}{8}$ = 25 mpg (table: 25, 100, 200, 300, 400; gallons 1, 4, 8, 12, 16). B: $\frac{140}{5}$ = 28. C: $\frac{81}{3}$ = 27. Car B.

Group Work

GRADE 6 • TOPIC 5 • LESSON 5.4 | 8 minutes total • 10 points

Work together. Each person must contribute a solution.

10. (p. 290) White to whole wheat flour is 4:5. Make a table for 4, 8, 12, 16 cups of white flour; graph.

11. (p. 290) Sugar to flour is 1:4. What point on a graph represents 8 cups of flour (x)?

Group Work — continued

GRADE 6 • TOPIC 5 • LESSON 5.4 | 8 minutes total • 10 points

Agree on a solution and be ready to explain it.

12. (p. 290) Ishwar reads 5 pages in 15 minutes; Anne reads 15 pages per hour. Who takes longer to read 300 pages, and by how much?

13. (p. 290) A circle has diameter 42 mm and circumference 132 mm. Find diameter when C = 198 mm; find C when d = 301 mm. Plot the pairs.

Group Work — Answer Key

GRADE 6 • TOPIC 5 • LESSON 5.4 | Discuss and justify

Scale both quantities equally; plot ordered pairs with labeled axes.

10. (p. 290)

White flour 4, 8, 12, 16; whole wheat 5, 10, 15, 20. Plot corresponding points; extend graph scale if needed.

11. (p. 290)

Graph: sugar is $\frac{1}{4}$ of flour. At 8 cups flour, point (8,2).

12. (p. 290)

Ishwar: $\frac{5 \text{ pages}}{15 \text{ min}}$ = 20 pages/h, 300 pages in 15 h. Anne: 15 pages/h, 300 in 20 h. Anne takes 5 h longer.

13. (p. 290)

$\frac{132}{42} = \frac{22}{7}$. Diameter for 198: $198 \times \frac{7}{22} = 63$ mm. Circumference for 301: $301 \times \frac{22}{7} =$ 946 mm. Plot (42,132), (63,198), (301,946).

Exit Ticket

GRADE 6 • TOPIC 5 • LESSON 5.4 | 2 minutes • Independent check

Before you leave, solve this problem.

If (4,10) is on a ratio graph through the origin, what is y when x=6?

Show your work.

Write the answer with the correct units or graph, if needed.