

Guided Practice



Determine whether the set of numbers in each table is proportional. If the relationship is proportional, identify the constant of proportionality. Explain your reasoning. (Examples 1 and 2)

1.

Blue Paint (quarts)	1	2	3	4
Yellow Paint (quarts)	5	6	7	8

No; the rates are not equal.

2.

Ice Tea Mix (cups)	1	2	3	4
Sugar (cups)	2	4	6	8

Yes; 2; each rate is equal to 2.

3. The cost of 13 gallons of gasoline is \$41.47. Find the constant of proportionality. Then write an equation relating cost to the number of gallons of gasoline. How much does 18.5 gallons of gasoline cost? (Example 3) **3.19; $c = 3.19g$; \$59.02**

Independent Practice

Go online for Step-by-Step Solutions



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4.

Cans of Concentrate	1	2	3	4
Cans of Water	4	8	12	16

Yes; 4; each rate is equal to 4.

5

Shaded Squares	1	2	3	4
Total Squares	8	15	30	42

No; the rates are not equal.

6.

Junk E-mails	10	20	30	40
Total E-mails	15	30	45	60

7.

Weeks	5	6	7	8
Days	35	42	49	56

Yes; 7; each rate is equal to 7.

6. Yes; $\frac{3}{2}$; each rate is equal to $\frac{3}{2}$.

8. **Financial Literacy** A store is having a sale where all jeans are $\frac{1}{4}$ off the regular price. Find the constant of proportionality, then write an equation relating the sale price to the regular price. How much would a pair of \$29 jeans cost on sale? (Example 3) **0.75; $s = 0.75r$; \$21.75**
9. Luke earned \$54 after mowing 3 lawns. Find the constant of proportionality, and then write an equation comparing earnings to lawns mowed. How much would Luke earn after mowing 7 lawns? (Example 3) **18; $p = 18\ell$; \$126**

B Copy and complete each table. Determine whether the relationship is proportional. If so, identify the constant of proportionality.

10. Ms. Rollins had an end-of-year pizza party for the chess team. At the party, every 2 students had 5 slices of pizza. **yes; 2.5**

Number of Students	2	4	6	8	10
Slices of Pizza	■	■	■	■	■

5 10 15 20 25

11. Admission to an amusement park is \$4 plus \$1.50 per ride. **no**

Number of Rides	1	2	3	4	5
Cost (\$)	■	■	■	■	■

5.50 7 8.50 10 11.50

12. It will cost \$7 per person to hold a birthday party at the recreation center. **yes; 7**

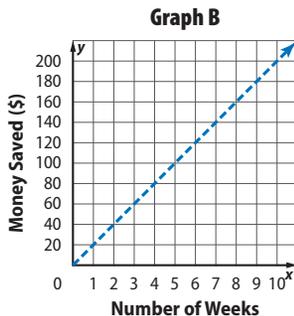
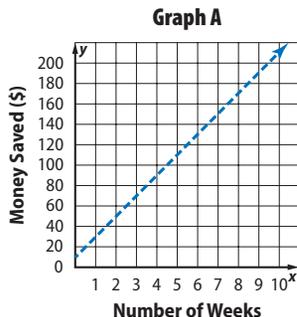
Number of Guests	6	7	8	9	10
Cost (\$)	■	■	■	■	■

42 49 56 63 70

13 Eight hot dogs and ten hot dog buns come in separate packages.

- Is the number of packages of hot dogs proportional to the number of hot dogs? If the relationship is proportional, identify the constant of proportionality. Explain your reasoning. **13–14. See Answer Appendix.**
- Suppose you buy the same number of packages of hot dogs and hot dog buns. Is the number of hot dogs proportional to the number of hot dog buns? If the relationship is proportional, identify the constant of proportionality. Explain your reasoning.

- 14.  Multiple Representations** Suppose Isabel decides to save \$20 each week for her family vacation. Her sister already has \$10 and wants to save an additional \$20 each week for the vacation. These situations are modeled in the graphs below.



- Table** Make a table showing the first six weeks of savings for each girl. Which situation is proportional? Explain your reasoning.
- Symbols** Write an equation to represent each situation.
- Graph** Compare and contrast the graphs.



H.O.T. Problems Higher Order Thinking

- 15.  Model with Mathematics** Give examples of two similar situations in which one is a proportional relationship and the second one is nonproportional. Identify the constant of proportionality. Then write equations that describe them. **15–18. See Answer Appendix.**
- 16.  Justify Conclusions** A recipe for paper maché paste includes $\frac{1}{4}$ cup of flour for every cup of water. If there are 6 cups of flour, how many gallons of water are needed? Identify the constant of proportionality. Explain your reasoning.
- 17.  Persevere with Problems** Many objects, such as credit cards, are shaped like golden rectangles. A *golden rectangle* is a rectangle in which the ratio of the length to the width is approximately 1.618 to 1. This ratio is called the *golden ratio*.
 - Find three different objects that are close to a golden rectangle. Make a table to display the dimensions and the ratio found in each object. **See students' work.**
 - Describe how each ratio compares to the golden ratio.
 - Use the Internet or another source to find three examples of where the golden rectangle is used in architecture.
- 18.  Building on the Essential Question** This year Monica is 12 years old, and her little sister Patrice is 6 years old. Is Monica's age proportional to Patrice's age? If the relationship is proportional, identify the constant of proportionality. Explain your reasoning using a table of values.



Standardized Test Practice

19. A bicycle wheel makes 30 revolutions in 45 feet. Which of these represents an equivalent rate of bicycle wheel revolutions? **A**
- A** 10 revolutions in 15 feet
B 60 revolutions in 100 feet
C 15 revolutions in 10 feet
D 100 revolutions in 60 feet
20. The cost of renting a boat for 4 hours is \$51. If the cost of renting a boat is proportional to the number of rental hours, which of the following is *not* an equivalent rate? **J**
- F** 6 hours for \$76.50
G 3 hours for \$38.25
H 7 hours for \$89.25
J 5 hours for \$63.00
21. The amount of sales tax paid on a purchase is proportional to the price of the item. Suppose the sales tax rate is 6.25%. If p is the price of the item and t is the sales tax, which equation represents this? **D**
- A** $p = 0.0625t$ **C** $t = 6.25p$
B $p = 6.25t$ **D** $t = 0.0625p$
22. **Short Response** The prices of different-sized smoothies at an ice cream shop are shown below. Is the cost proportional to the size of the cone? If so, identify the constant of proportionality. Explain your reasoning.
No; the ratio of cost to ounces is not constant.

Size (oz)	16	20	24
Cost (\$)	3.25	3.75	4.25



Common Core Review

Complete each conversion. Round to the nearest hundredth, if necessary. 7.RP.1

23. 4 in. \approx ■ cm **10.16** 24. 5 L \approx ■ gal **1.32**
 25. 1500 lb \approx ■ kg **681** 26. 14 yd \approx ■ m **12.80**

Express each rate as a unit rate. Round to the nearest tenth, if necessary. 7.RP.1

27. 140 miles on 6 gallons **23.3 mi per gal** 28. 19 yards in 2.5 minutes **7.6 yd per min**
 29. 236.7 miles in 4.5 days **52.6 mi per day** 30. 331.5 pages in 8.5 weeks **39 pages per wk**
 31. $5\frac{1}{2}$ feet in 3 minutes **$1\frac{5}{6}$ ft per min** 32. 352 beats in $4\frac{2}{5}$ minutes **80 beats per min**

33. The table shows the record high and low temperatures for selected states. What is the difference between the highest and lowest temperatures for Kentucky? Massachusetts? **7.NS.1c 151°F; 142°F**

State	Lowest Temperature (°F)	Highest Temperature (°F)
Kentucky	-37	114
Massachusetts	-35	107

For Exercises 34–35, write an expression to represent each real-world situation. Then evaluate the expression and interpret the meaning of the solution. 7.NS.3

34. Nikos paid \$22,500 for a new car. Over the next 3 years the value of his dropped \$3750. How much did the value of the car drop each year on average?
See margin.
35. The temperature dropped a total of 27°F over a 9-hour period. What was the mean hourly temperature drop? **$-27 \div 9$; -3°F ; The temperature dropped 3°F on average each hour.**



Interactive Study Guide

See page 107 for:
• Mid-Chapter Check