LESSON MAKER PRO

Rate Detectives

Find and compare rates in tables, equations, and graphs.

GRADE 7 · 7.A.2.1

7.A.2.1 "Represent proportional relationships with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. Determine and compare the unit rate (constant of proportionality, slope..."

NAME _____ DATE _____

ONE RATE, MANY FORMS

In a proportional relationship, dividing y by x gives the same unit rate for every row or point where x is not zero. That rate is the number multiplying x in y = kx. On a graph, it is the rise when x increases by 1.

WORKED EXAMPLE

Use the table to find the miles per hour. Then write an equation for miles y after x hours.

BIKE RIDE

Hours (x)	Miles (y)
5	45
10	90

1. Divide miles by hours: 45/5 = 9.
2. Check the other row: 90/10 = 9.
3. Use the rate to write y = 9x.

Answer: 9 miles per hour; y = 9x

PRACTICE 4 problems

1 For y = 4x, what is the unit rate?

ANSWER _____

2 You earn 14 stickers in 2 minutes at a steady rate. How many stickers do you earn per minute?

ANSWER _____

3 A proportional relationship includes (1, 12) and (2, 24). Find its unit rate and write its equation.

ANSWER _____

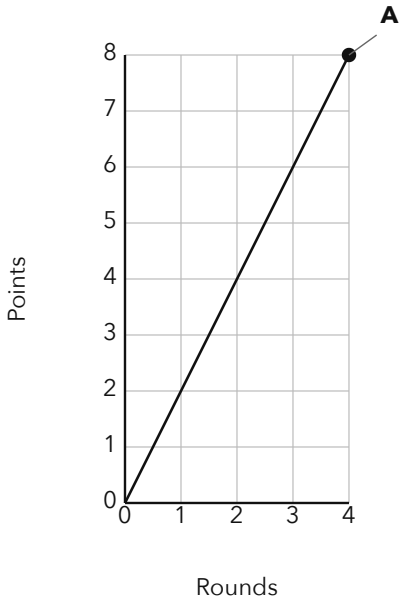
_____

4 A video downloads 18 MB in 3 seconds at a steady rate. Write an equation for MB y after x seconds.

ANSWER _____

APPLY IT Show your work

1 Your game score grows as shown. At the same rate, how many points will you have after 7 rounds?



ANSWER _____

2 The table shows Shop A's music prices. Shop B charges $4 per song. Which shop costs less for 8 songs, and by how much?

SHOP A

Songs	Cost ($)
1	3
2	6
4	12

ANSWER _____

CHALLENGE One step up

A student says this table is proportional because y increases by 4 when x increases by 1. Is the student right? Explain using two unit rates.

VALUES OF X AND Y

x	y
1	7
2	11
4	19

WORK SPACE AND ANSWER

ANSWER KEY

Rate Detectives

GRADE 7 · 7.A.2.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For y = 4x, what is the unit rate?	**4**
2	You earn 14 stickers in 2 minutes at a steady rate. How many stickers do you earn per minute?	**7 stickers per minute**
3	A proportional relationship includes (1, 12) and (2, 24). Find its unit rate and write its equation.	**Unit rate: 12; equation: y = 12x**
4	A video downloads 18 MB in 3 seconds at a steady rate. Write an equation for MB y after x seconds.	**y = 6x**

PART 2 · APPLY IT

1. **14 points** The graph shows 8 points in 4 rounds, or 2 points per round. Multiply 7 by 2.
2. **Shop A costs $8 less.** Shop A charges $3 per song, so 8 songs cost $24. Shop B charges $32, which is $8 more.

CHALLENGE

No. The unit rates are 7/1 = 7 and 11/2 = 5.5. They differ, so the relationship is not proportional.

Accept equivalent equations and rates with appropriate units. For the challenge, accept any two rows with different values of y/x.