LESSON MAKER PRO

Rate Detectives

Find the rate that connects two quantities.

GRADE 7 · 7A.PR.A.2

7A.PR.A.2 "Represent a relationship between two quantities and determine whether the two quantities are related proportionally. a. Use equivalent ratios displayed in a table or in a graph of the relationship in the coordinate plane to determine..."

NAME _____ DATE _____

THE BIG IDEA

Divide each y-value by its matching nonzero x-value. If the quotients match and (0,0) fits, the relationship is proportional. Write its equation as y = rx, where r is the unit rate.

WORKED EXAMPLE

Is the relationship in the table proportional? Find the unit rate.

x	y
3	21
6	42
9	63

1. 21/3 = 7, 42/6 = 7, and 63/9 = 7.
2. The quotients match, so y = 7x.
3. (0,0) also fits y = 7x.

Answer: Yes. The unit rate is 7.

PRACTICE 4 problems

1 The pairs (1,8) and (4,32) belong to a proportional relationship. Find its unit rate and write its equation.

ANSWER _____

2 Could (1,11) and (4,45) belong to the same proportional relationship? Explain briefly.

ANSWER _____

3 A proportional relationship has unit rate 13. Give its points when x = 0 and x = 1.

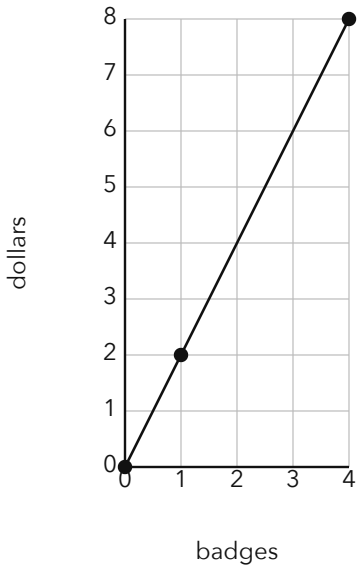
ANSWER _____

4 Tickets cost $16 each. Write an equation for the total cost y of x tickets.

ANSWER _____

APPLY IT Show your work

1 A creator sells digital badges. Use the graph. Are earnings proportional to badges sold? Give the unit rate, and explain (0,0) and (1,2).



ANSWER _____

2 A school club sells button packs. Use the table. Is the cost proportional to the number of packs? Find the cost of 8 packs.

Packs	Cost ($)
0	0
1	13
4	52

ANSWER _____

CHALLENGE One step up

A game gives you 11 tokens to start and 8 more after each level. A player says tokens are proportional to levels because each level adds the same amount. Explain the mistake using (0,0), then write an equation for y tokens after x levels.

WORK SPACE AND ANSWER

ANSWER KEY # Rate Detectives

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The pairs (1,8) and (4,32) belong to a proportional relationship. Find its unit rate and write its equation.	**Unit rate: 8. Equation: y = 8x.**
2	Could (1,11) and (4,45) belong to the same proportional relationship? Explain briefly.	**No. The ratios 11/1 and 45/4 are not equal.**
3	A proportional relationship has unit rate 13. Give its points when x = 0 and x = 1.	**(0,0) and (1,13)**
4	Tickets cost $16 each. Write an equation for the total cost y of x tickets.	**y = 16x**

PART 2 · APPLY IT

1. **Yes. The unit rate is $2 per badge. (0,0) means no badges sold earns $0; (1,2) means one badge sold earns $2.** The line passes through the origin, and its points show $2 earned per badge.
2. **Yes. Eight packs cost $104.** Each pack costs $13, and the table includes (0,0). Multiply 8 by 13 to get $104.

CHALLENGE

The relationship is not proportional: at 0 levels, you have 11 tokens, not 0. The equation is y = 8x + 11.

Accept equivalent explanations that compare unit rates or show why the relationship does or does not pass through (0,0).