LESSON MAKER PRO

# Rate Detectives

*Test relationships and find unit rates*

**GRADE 7 · MT.7.RP.2**

**MT.7.RP.2** "Recognize and represent proportional relationships between quantities, using tables, graphs, and equations by: Deciding whether a table represents quantities in a proportional relationship..."

NAME _____ DATE _____

## THE BIG IDEA

A relationship is proportional when every y/x ratio is the same. Its graph is a straight line through the origin, and its equation has the form y = kx. The number k is the unit rate.

## WORKED EXAMPLE

Does the table show a proportional relationship? Find the unit rate.

| x | y |
|---|---|
| 3 | 21 |
| 6 | 42 |

1. 21/3 = 7.
2. 42/6 = 7.
3. The ratios match, so the relationship is proportional.

**Answer: Yes. The unit rate is 7.**

## PRACTICE 4 problems

**1** For y = 5x, find the unit rate.

**ANSWER** _____

**2** Is y = 9x + 1 proportional? Give a reason.

**ANSWER** _____

**3** The pairs (2, 8), (5, 20), and (10, 40) give (x, y). Is the relationship proportional? Find the unit rate.

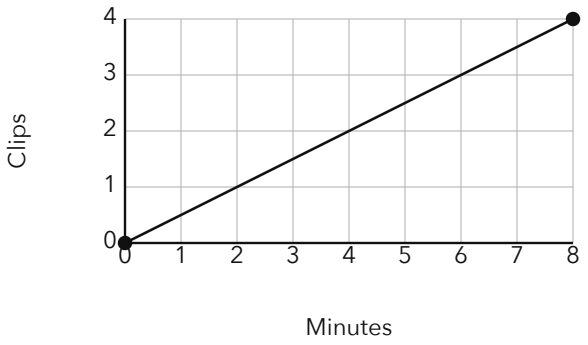
**ANSWER** _____

**4** The pairs (2, 8) and (5, 19) give (x, y). Are the ratios equivalent? Is the relationship proportional?

**ANSWER** _____

## APPLY IT Show your work

**1** A video app saves clips at a steady rate. The graph shows clips saved over time. Is the relationship proportional? Find the clips saved per minute.




**ANSWER** _____

**2** The table shows bracelet prices at a school fair. Is cost proportional to the number of bracelets? Find the price of one bracelet and the cost of 9 bracelets.

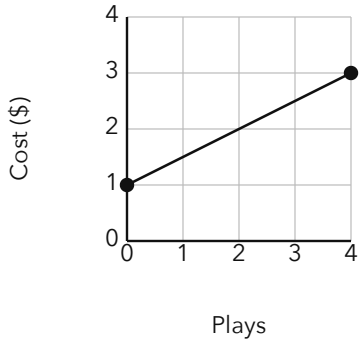
**SCHOOL FAIR BRACELETS**

| Bracelets | Cost ($) |
|---|---|
| 1 | 5 |
| 2 | 10 |
| 4 | 20 |

**ANSWER** _____

## CHALLENGE One step up

An arcade charges for plays as shown. A student says the relationship is proportional because the graph is straight. Explain the mistake and write the equation.




WORK SPACE AND ANSWER

# Rate Detectives



## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | For y = 5x, find the unit rate. | **5** |
| 2 | Is y = 9x + 1 proportional? Give a reason. | **No. When x = 0, y = 1, not 0.** |
| 3 | The pairs (2, 8), (5, 20), and (10, 40) give (x, y). Is the relationship proportional? Find the unit rate. | **Yes. The unit rate is 4.** |
| 4 | The pairs (2, 8) and (5, 19) give (x, y). Are the ratios equivalent? Is the relationship proportional? | **No. The ratios are 8/2 = 4 and 19/5, so the relationship is not proportional.** |

## PART 2 · APPLY IT

1. **Yes; 1/2 clip per minute.** The graph is a straight line through the origin. The point (8, 4) gives a unit rate of 4/8 = 1/2 clip per minute.
2. **Yes; $5 per bracelet and $45 for 9 bracelets.** Each cost divided by its bracelet count is 5, so the cost is proportional. Nine bracelets cost 9 × $5 = $45.

## CHALLENGE

**A proportional graph must also pass through the origin. This graph crosses the y-axis at 1, so it is not proportional. Its equation is y = x/2 + 1.**

Accept 0.5 in place of 1/2. For the challenge, accept an equivalent equation such as y = 0.5x + 1.