LESSON MAKER PRO

Rate Representation Lab

Use equations, tables, and graphs to show constant rates.

GRADE 7 · TEKS 7.1.E

7.1.E "create and use representations to organize, record, and communicate mathematical ideas;"

NAME _____ DATE _____

SHOW THE RATE

A proportional relationship has the same unit rate for every pair of values. If x is the number of units and y is the total, write the relationship as y = kx, where k is the amount for one unit. You can communicate the relationship with an equation, a table, or points on a graph.

WORKED EXAMPLE

Four tickets cost $28 at a constant price. Let x be the number of tickets and y be the cost in dollars. Write an equation, then find the cost of 9 tickets.

1. Find the unit rate: 28/4 = 7.
2. Write the equation: y = 7x.
3. Substitute x = 9: y = 7(9).
4. Multiply: y = 63.

Answer: y = 7x; 9 tickets cost $63.

PRACTICE 6 problems

1 Write an equation for a relationship with a unit rate of 5. Let y be the total amount and x be the number of units.

ANSWER _____

2 The pairs (3, 18) and (8, 48) are proportional. Write an equation that relates y to x.

ANSWER _____

3 Twelve notebooks cost $36 at the same price each. Let y be the cost in dollars for x notebooks. Write an equation.

ANSWER _____

4 Use y = 8x. Find y when x = 11.

ANSWER _____

5 A club pays $55 for 5 posters at a constant price. What is the price per poster?

ANSWER _____

6 Which ordered pair lies on the graph of y = 6x: (10, 60) or (10, 54)?

ANSWER _____

APPLY IT Show your work

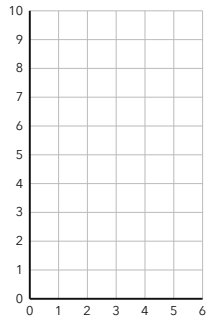
1 A gaming club tracks points earned at a constant rate. The table shows points y after x hours. Write an equation for the relationship. Then find the points earned after 5 hours.

GAMING CLUB POINTS

Hours, x	Points, y
1	12
2	24
3	36

ANSWER _____

2 A student council sells reusable water bottles for $2 each. Let x be the number of bottles sold and y be the money earned in dollars. On the grid, plot the points for 1, 3, and 5 bottles. Then write the equation that represents the relationship.



ANSWER _____

CHALLENGE One step up

Two fundraising plans use these equations, where x is the number of items sold and y is the money earned in dollars. Plan A: y = 6x. Plan B: y = 3x + 15. Which plan is proportional? Explain how you know. At how many items sold will both plans earn the same amount?

WORK SPACE AND ANSWER

ANSWER KEY

Rate Representation Lab

GRADE 7 · TEKS 7.1.E

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write an equation for a relationship with a unit rate of 5. Let y be the total amount and x be the number of units.	**y = 5x**
2	The pairs (3, 18) and (8, 48) are proportional. Write an equation that relates y to x.	**y = 6x**
3	Twelve notebooks cost $36 at the same price each. Let y be the cost in dollars for x notebooks. Write an equation.	**y = 3x**
4	Use y = 8x. Find y when x = 11.	**88**
5	A club pays $55 for 5 posters at a constant price. What is the price per poster?	**$11 per poster**
6	Which ordered pair lies on the graph of y = 6x: (10, 60) or (10, 54)?	**(10, 60)**

PART 2 · APPLY IT

1. **y = 12x; 60 points** The unit rate is 12 points per hour, so y = 12x. Substitute x = 5 to get y = 60.
2. **Points: (1, 2), (3, 6), (5, 10); y = 2x** Multiply each number of bottles by 2 to find the money earned. The constant rate is 2 dollars per bottle, so y = 2x.

CHALLENGE

Plan A is proportional because it has the form y = kx. Plan B is not proportional because it starts with 15. Both plans earn the same amount when x = 5, and y = 30.

Accept equivalent equation forms, such as 5x = y. For the challenge, accept any clear explanation that Plan B has a nonzero starting amount and both plans are equal at 5 items.