LESSON MAKER PRO

Origin Check

Decide when a linear relationship is proportional.

GRADE 8 · MA.8.AR.3.1

MA.8.AR.3.1 "Determine if a linear relationship is also a proportional relationship."

NAME _____ DATE _____

THE BIG IDEA

A linear relationship is proportional when it can be written as y = kx, where k is a constant. It has a y-intercept of 0, so its graph passes through the origin and its y/x ratio is constant when x is not 0.

WORKED EXAMPLE

Use the table to decide whether y is proportional to x.

EXAMPLE DATA

x	y
3	33
4	44

1. Find the ratios: 33/3 = 11 and 44/4 = 11.
2. The constant ratio is 11, so the equation is y = 11x.
3. The equation has a y-intercept of 0.

Answer: Yes, y is proportional to x.

PRACTICE 6 problems

1 Is y = 6x a proportional relationship?

ANSWER _____

2 Is y = 8x + 5 a proportional relationship? Explain.

ANSWER _____

3 The ordered pairs are (0, 0), (2, 14), and (5, 35). Is the relationship proportional?

ANSWER _____

4 Is y = -2x a proportional relationship?

ANSWER _____

5 The equation 6x - y = 8 represents a linear relationship. Rewrite it in y = mx + b form. Then decide whether it is proportional.

ANSWER _____

6 A linear relationship passes through (0, 0) and (7, 35). Is it proportional? Explain.

ANSWER _____

APPLY IT Show your work

1 A gaming club charges $2 to join a tournament and $6 for each match a player enters. Let x be the number of matches and y be the total cost. Is y proportional to x? Write an equation and explain.

WORK SPACE

ANSWER _____

2 A podcast club gives 7 points for each episode a student reviews. Let x be the number of episodes reviewed and y be the number of points earned. Is y proportional to x? Write an equation and explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A line passes through (-2, -10) and (6, 30). Is the linear relationship proportional? Show how you know.

WORK SPACE AND ANSWER

ANSWER KEY

Origin Check

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Is y = 6x a proportional relationship?	**Yes; y = 6x is in the form y = kx.**
2	Is y = 8x + 5 a proportional relationship? Explain.	**No; the y-intercept is 5, not 0.**
3	The ordered pairs are (0, 0), (2, 14), and (5, 35). Is the relationship proportional?	**Yes; the relationship is y = 7x.**
4	Is y = -2x a proportional relationship?	**Yes; y = -2x is in the form y = kx.**
5	The equation 6x - y = 8 represents a linear relationship. Rewrite it in y = mx + b form. Then decide whether it is proportional.	**y = 6x - 8; no, because the y-intercept is -8.**
6	A linear relationship passes through (0, 0) and (7, 35). Is it proportional? Explain.	**Yes; the line passes through the origin and has equation y = 5x.**

PART 2 · APPLY IT

1. **No; y = 6x + 2. The $2 joining fee means the relationship does not start at 0.** Write total cost as the match cost plus the joining fee: y = 6x + 2. Since the y-intercept is 2, the relationship is not proportional.
2. **Yes; y = 7x. There is a constant rate of 7 points per episode and 0 episodes earn 0 points.** Multiply the number of episodes by 7 to get y = 7x. The equation has a y-intercept of 0, so it is proportional.

CHALLENGE

Yes. The slope is (30 - (-10)) / (6 - (-2)) = 40/8 = 5, so the equation is y = 5x. Its y-intercept is 0.

Accept equivalent equation forms, including 6x - y = 8 for problem 5. For items that ask for an explanation, accept a correct statement that the relationship does or does not have a y-intercept of 0.