LESSON MAKER PRO

Same Rate or Not?

Compare ratios, rules, and graphs.

GRADE 7 · 7A.PR.B

7A.PR.B "Analyze the relationship between proportional and non-proportional situations."

NAME _____ DATE _____

CHECK THE RATIO

In a proportional relationship, output divided by input is always the same for every nonzero input. Its rule is y = kx, and its graph passes through (0, 0). A fixed starting amount makes a relationship non-proportional.

WORKED EXAMPLE

The input-output pairs are (17, 51) and (34, 102). Is the relationship proportional?

1. Find the first ratio: 51/17 = 3.
2. Find the second ratio: 102/34 = 3.
3. The ratios match, so both pairs follow y = 3x.

Answer: Yes, the relationship is proportional.

PRACTICE 6 problems

1 Is the relationship in the table proportional? If so, find the output per input.

INPUT AND OUTPUT

Input	Output
2	10
6	30
8	40

ANSWER _____

2 Is the relationship in the table proportional? If not, what amount is added to each input to get the output?

INPUT AND OUTPUT

Input	Output
2	12
6	16
8	18

ANSWER _____

3 Is y = 7x proportional? Find y when x = 6.

ANSWER _____

4 Is y = 8x + 9 proportional? Find y when x = 6.

ANSWER _____

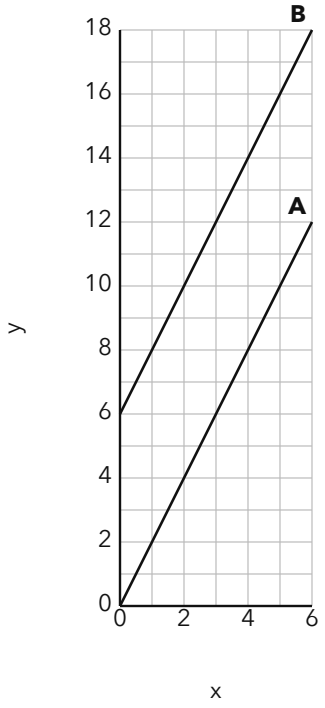
5 The table shows a proportional relationship. What is the missing output?

INPUT AND OUTPUT

Input	Output
2	18
6	54
10	90
12	?

ANSWER _____

6 Which line shows a proportional relationship? What is its constant of proportionality?



ANSWER _____

APPLY IT Show your work

1 At a skate rink, one pass costs $8 per visit. Another costs $10 up front plus $6 per visit. Which cost is proportional to the number of visits? Which pass costs less for 6 visits, and by how much?

WORK SPACE

ANSWER _____

2 A student makes bracelets for a school fair. Supplies cost $10 up front plus $2 per bracelet. Each bracelet sells for $8. Which amount is proportional to the number of bracelets, supply cost or sales income? Find both amounts for 8 bracelets.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A ride costs a fixed pickup fee plus a cost per mile. A 2-mile ride costs $16, and a 6-mile ride costs $40. Find the pickup fee and the cost per mile. Is the total cost proportional to the number of miles? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

Same Rate or Not?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Is the relationship in the table proportional? If so, find the output per input.	**Yes; 5 output units per input unit.**
2	Is the relationship in the table proportional? If not, what amount is added to each input to get the output?	**No; 10 is added to each input.**
3	Is y = 7x proportional? Find y when x = 6.	**Yes; y = 42.**
4	Is y = 8x + 9 proportional? Find y when x = 6.	**No; y = 57.**
5	The table shows a proportional relationship. What is the missing output?	**108**
6	Which line shows a proportional relationship? What is its constant of proportionality?	**Line A; the constant of proportionality is 2.**

PART 2 · APPLY IT

1. **The $8-per-visit pass is proportional. For 6 visits, the pass with the up-front cost is $2 cheaper.** The costs for 6 visits are 8 × 6 = $48 and 10 + 6 × 6 = $46. Only the first pass has no fixed starting cost.
2. **Sales income is proportional. For 8 bracelets, supply cost is $26 and sales income is $64.** Supply cost is 10 + 2 × 8 = $26, while sales income is 8 × 8 = $64. The up-front supply cost makes that relationship non-proportional.

CHALLENGE

The cost per mile is ($40 − $16)/(6 − 2) = $6. The pickup fee is $16 − 2 × $6 = $4. The total cost is not proportional to miles because it includes a $4 fixed fee.

Accept equivalent wording for output per input and for a fixed fee. For the graph problem, students may identify line A by noting that it passes through (0, 0).