

Spotting Proportional Relationships in Tables and Graphs

Grade 7 math · Worksheet · Standards: 7.RP.A.2a, 7.RP.A.2b, 7.RP.A.2d

Name: _____ Date: _____ Class: _____

These 20 problems cover standards 7.RP.A.2a, 7.RP.A.2b and 7.RP.A.2d: deciding whether two quantities are proportional, finding the constant of proportionality, and reading the points (0, 0) and (1, r).

Start with tables, move to graphs, then finish with word problems that mix several skills. Always show the ratios that justify your conclusion.

Standards: 7.RP.A.2a, 7.RP.A.2b, 7.RP.A.2d · **Level:** Grade 7

Problem 1 Testing a Ticket Table (easy)

The table shows the cost of tickets at a school carnival. Is the cost proportional to the number of tickets? If so, find the constant of proportionality.

Tickets	5	8	12
Cost (dollars)	17.50	28.00	42.00

Problem 2 Gym Fee Table (easy)

A gym charges an enrollment fee plus a monthly rate. Is the total cost proportional to the number of months?

Months	1	2	3	4
Total (dollars)	8	13	18	23

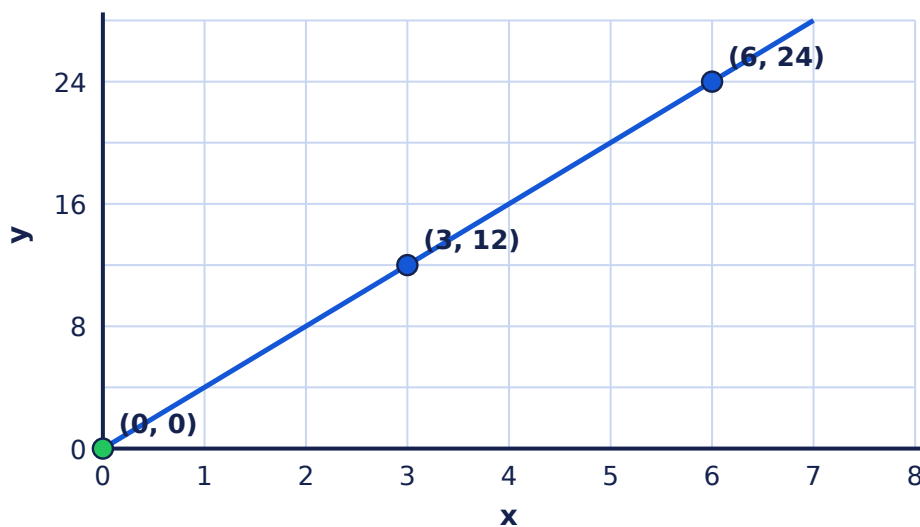
Problem 3 Cookies per Cup of Flour (easy)

A bakery records how many cookies it makes from different amounts of flour. Find the constant of proportionality and explain its meaning.

Flour (cups)	1.5	3	4.5
Cookies	18	36	54

Problem 4 Proportional Graph Check (easy)

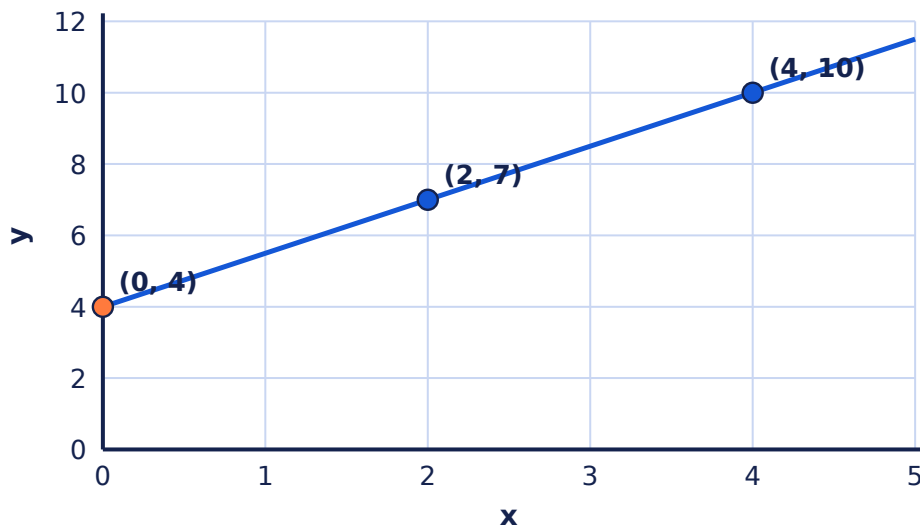
The graph shows a straight line through $(0, 0)$, $(3, 12)$ and $(6, 24)$. Is the relationship proportional? Find the constant of proportionality.



Graph for Problem 4.

Problem 5 Straight Line, but Not Proportional (easy)

Jin says the graph is proportional because it is a straight line. Is Jin correct? Explain.



Graph for Problem 5.

Problem 6 Meaning of Key Points (easy)

The graph of earnings in dollars against hours worked is a proportional relationship. It contains the points $(0, 0)$ and $(1, 11.25)$. Explain what each point means.

Problem 7 Which Situation Is Proportional (medium)

Which situation is proportional? Explain.

- a. A pizza costs \$11 plus a \$4 delivery fee. Cost versus number of pizzas.
- b. A walker moves at a steady 3.2 miles per hour. Distance versus hours.
- c. Ava is 3 years older than her cousin. Ava's age versus the cousin's age.

Problem 8 Fractions in a Table (medium)

A recipe's spice amount depends on the batch size. Decide if the table is proportional and find k .

Batches	$\frac{1}{2}$	$\frac{3}{2}$	$\frac{5}{2}$
Spice (tbsp)	3	9	15

Problem 9 Sprinkler Table (medium)

A sprinkler uses water at a constant rate. Find the missing value.

Minutes	5	8	10	15
Gallons	14	22.4	?	42

Problem 10 Comparing Two Tables (medium)

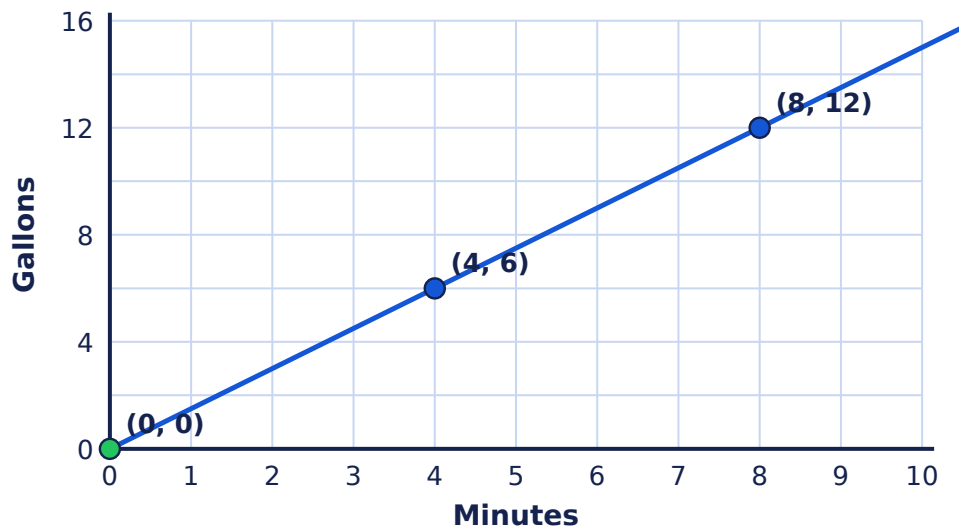
Table A and Table B show the cost of lab kits. Which table is proportional? Justify.

A: Kits	2	4	6
Cost (dollars)	9	18	27
B: Kits	2	4	6
Cost (dollars)	9	17	25

Problem 11 Water in a Tank (medium)

The graph shows gallons of water in a tank over time.

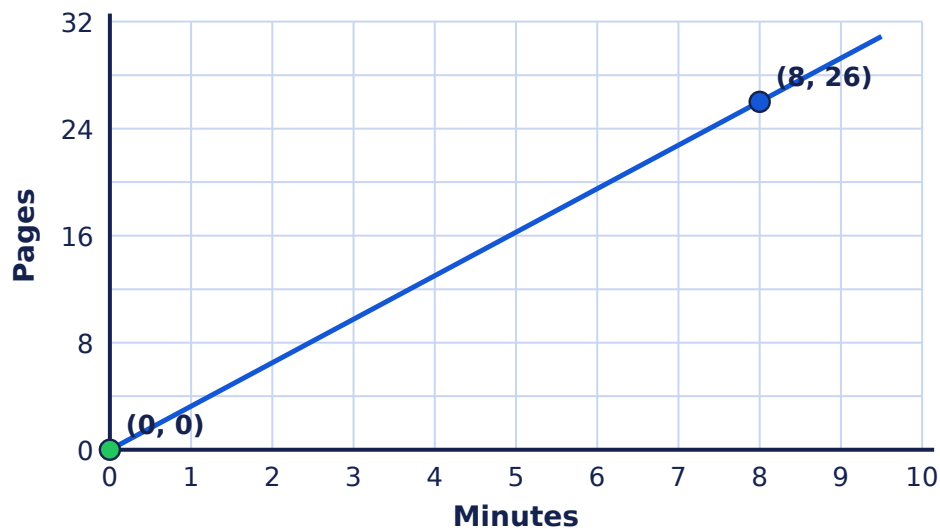
- a. Find the constant of proportionality.
- b. How many gallons are in the tank after 10 minutes?



Water in a tank for Problem 11.

Problem 12 Printer Speed from a Graph (medium)

The graph shows pages printed over time. Find the constant of proportionality and explain what it means.



Printer output for Problem 12.

Problem 13 Paint Mixing Ratio (medium)

A paint mix uses 3 cups of blue for every 5 cups of white. Complete the table, then give the constant of proportionality for white versus blue.

blue 3
white 5

One batch: 3 cups of blue and 5 cups of white.

Blue (cups)	3	6	9	12
White (cups)	5	10	?	?

Problem 14 Points That Do Not Line Up (medium)

A graph contains the points (1, 3), (2, 6) and (3, 8). Is the relationship proportional? Explain.

Problem 15 Lunch Receipt (hard)

A food truck receipt shows: 4 sandwiches for \$22.00, 6 sandwiches for \$33.00, and 9 sandwiches for \$49.50.

- Is the cost proportional to the number of sandwiches?
- Find the cost of 14 sandwiches.
- How many sandwiches can be bought for \$77.00?

Problem 16 Window Washer (hard)

A window washer cleans 12 windows in 45 minutes at a constant rate.

- Find the constant of proportionality in minutes per window.
- How long will 20 windows take?
- Why is the point (0, 0) on the graph?

Problem 17 Taxi Fare (hard)

A taxi charges a base fee plus a price per mile. The table shows the fares.

Miles	0	1	2	4
Fare (dollars)	3.50	5.75	8.00	12.50

- Is the fare proportional to the miles? Explain.
- If there were no base fee, what would the constant of proportionality be, and what would a 4-mile trip cost?

Problem 18 Robot Arm Movement (hard)

A robot arm moves along a rail. Distances are recorded over time.

Seconds	2	5	9
Distance (cm)	13	32.5	58.5

- Show that the relationship is proportional.
- Find the distance after 12 seconds.

c. How many seconds does it take to travel 91 cm?

Problem 19 Two Text Plans (hard)

Plan A charges \$0.12 per text message and nothing else. Plan B charges \$5.00 per month plus \$0.05 per text.

- Which plan is proportional? Give its constant of proportionality.
- Find each plan's cost for 40 texts and for 100 texts.
- Which plan is cheaper in each case, and by how much?

Problem 20 3D Printer Filament (hard)

A 3D printer uses filament at a constant rate.

Minutes	$\frac{3}{2}$	4	$\frac{15}{2}$
Grams	$\frac{3}{4}$	2	$\frac{15}{4}$

- Show that the relationship is proportional and find k .
- How many grams are used in 25 minutes?
- How many minutes does it take to use 9 grams?