

Spotting Proportional Relationships in Tables and Graphs

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

Every solution shows the ratios or the graph features that justify the conclusion, then names the constant of proportionality with its units. Use the key to find the step where your work first differed from the solution.

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

Problem 1 Testing a Ticket Table

$$17.50 \div 5 = 3.5, 28 \div 8 = 3.5, 42 \div 12 = 3.5.$$

All ratios are equal.

Answer: **Yes, proportional; $k = 3.5$ dollars per ticket**

Problem 2 Gym Fee Table

$$8 \div 1 = 8, 13 \div 2 = 6.5, 18 \div 3 = 6, 23 \div 4 = 5.75.$$

The ratios are different.

Answer: **Not proportional**

Problem 3 Cookies per Cup of Flour

$$18 \div 1.5 = 12, 36 \div 3 = 12, 54 \div 4.5 = 12.$$

Each cup of flour makes 12 cookies.

Answer: **$k = 12$ cookies per cup of flour**

Problem 4 Proportional Graph Check

The points lie on a line that passes through the origin.

$$12 \div 3 = 4 \text{ and } 24 \div 6 = 4.$$

Answer: **Yes, proportional; $k = 4$**

Problem 5 Straight Line, but Not Proportional

The line crosses the y-axis at (0, 4), not at (0, 0).

Ratios: $7 \div 2 = 3.5$ and $10 \div 4 = 2.5$ are different.

Answer: **No, Jin is not correct, because the line does not pass through (0, 0)**

Problem 6 Meaning of Key Points

(0, 0): 0 hours worked earn \$0.

(1, 11.25): 1 hour of work earns \$11.25.

Answer: **(0, 0) means no work, no pay; (1, 11.25) means the unit rate is \$11.25 per hour**

Problem 7 Which Situation Is Proportional

(a) 1 pizza: 15, 2 pizzas: 26. $15 \div 1 \neq 26 \div 2$, and 0 pizzas would still cost \$4. Not proportional.

(b) Distance = $3.2 \times$ hours, so the ratio is always 3.2, and 0 hours gives 0 miles. Proportional.

(c) Ages 10 and 13, then 20 and 23: $13 \div 10 \neq 23 \div 20$. Not proportional.

Answer: **Only (b) is proportional**

Problem 8 Fractions in a Table

$3 \div \frac{1}{2} = 6$, $9 \div \frac{3}{2} = 6$, $15 \div \frac{5}{2} = 6$.

Answer: **Proportional; $k = 6$ tablespoons per batch**

Problem 9 Sprinkler Table

$14 \div 5 = 2.8$, $22.4 \div 8 = 2.8$, $42 \div 15 = 2.8$, so $k = 2.8$.

$10 \times 2.8 = 28$.

Answer: **28 gallons**

Problem 10 Comparing Two Tables

A: $9 \div 2 = 4.5$, $18 \div 4 = 4.5$, $27 \div 6 = 4.5$.

B: $9 \div 2 = 4.5$, $17 \div 4 = 4.25$, $25 \div 6 \approx 4.17$.

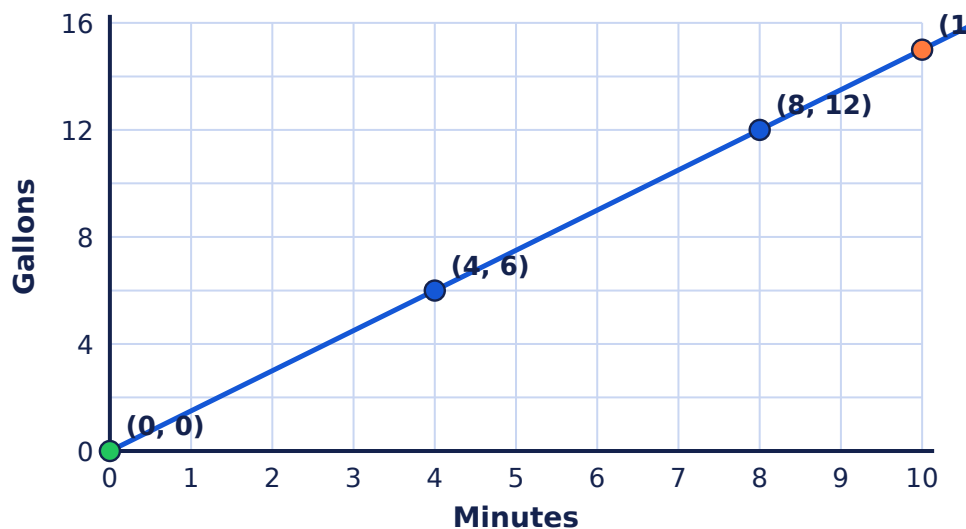
Answer: **Table A is proportional ($k = 4.5$); Table B is not**

Problem 11 Water in a Tank

(a) $6 \div 4 = 1.5$ and $12 \div 8 = 1.5$, so $k = 1.5$ gallons per minute.

(b) $10 \times 1.5 = 15$.

Answer: **$k = 1.5$; 15 gallons**



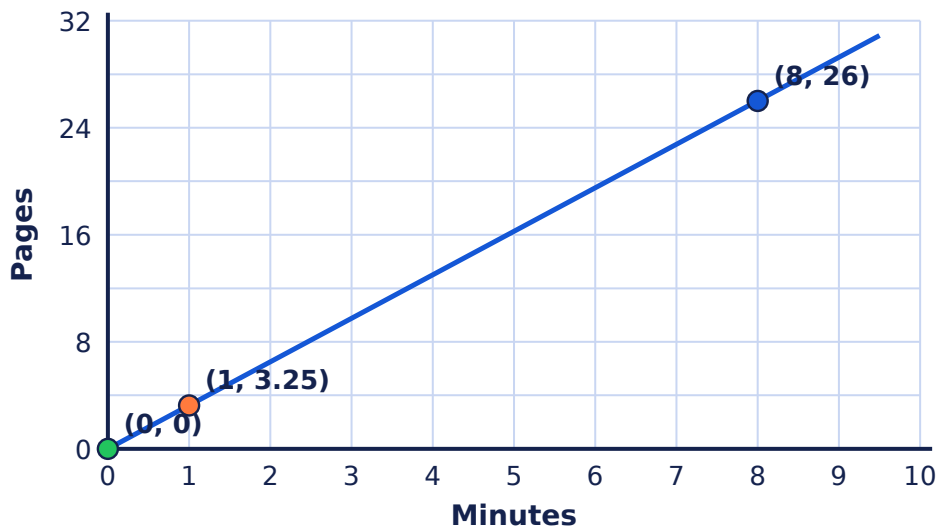
At 10 minutes the tank holds 15 gallons.

Problem 12 Printer Speed from a Graph

$26 \div 8 = 3.25$.

The point (1, 3.25) is on the line, so 1 minute prints 3.25 pages.

Answer: **$k = 3.25$ pages per minute**



The point (1, 3.25) shows 3.25 pages per minute.

Problem 13 Paint Mixing Ratio

$$\text{White} \div \text{blue} = \frac{5}{3}.$$

$$9 \times \frac{5}{3} = 15, \text{ and } 12 \times \frac{5}{3} = 20.$$

Answer: **15 and 20 cups; $k = \frac{5}{3}$ cups of white per cup of blue**

Problem 14 Points That Do Not Line Up

$$3 \div 1 = 3, 6 \div 2 = 3, 8 \div 3 \approx 2.67.$$

The third ratio differs, and the points do not form one straight line.

Answer: **Not proportional**

Problem 15 Lunch Receipt

$$(a) 22 \div 4 = 5.5, 33 \div 6 = 5.5, 49.5 \div 9 = 5.5. \text{ Yes, } k = 5.5.$$

$$(b) 14 \times 5.5 = 77.$$

$$(c) 77 \div 5.5 = 14.$$

Answer: **Yes; \$77.00 for 14 sandwiches; 14 sandwiches for \$77.00**

Problem 16 Window Washer

$$(a) 45 \div 12 = 3.75 \text{ minutes per window.}$$

(b) $20 \times 3.75 = 75$ minutes.

(c) Cleaning 0 windows takes 0 minutes.

Answer: **3.75 min per window; 75 minutes; (0, 0) means 0 windows take 0 minutes**

Problem 17 Taxi Fare

(a) The fare for 0 miles is \$3.50, not \$0, so the point (0, 0) is missing. Also $5.75 \div 1 = 5.75$ but $8 \div 2 = 4$. Not proportional.

(b) The price per mile is $8.00 - 5.75 = 2.25$. Without the fee, $k = 2.25$ and $4 \times 2.25 = 9.00$.

Answer: **Not proportional; $k = \$2.25$ per mile; \$9.00 for 4 miles**

Problem 18 Robot Arm Movement

(a) $13 \div 2 = 6.5$, $32.5 \div 5 = 6.5$, $58.5 \div 9 = 6.5$, so $k = 6.5$ cm per second.

(b) $12 \times 6.5 = 78$.

(c) $91 \div 6.5 = 14$.

Answer: **Proportional; 78 cm; 14 seconds**

Problem 19 Two Text Plans

(a) Plan A: cost = $0.12 \times$ texts, so $k = 0.12$ and (0, 0) is on the graph. Plan B costs \$5.00 even for 0 texts, so it is not proportional.

(b) 40 texts: A = 4.80, B = $5 + 2 = 7.00$. 100 texts: A = 12.00, B = $5 + 5 = 10.00$.

(c) 40 texts: A is cheaper by $7.00 - 4.80 = 2.20$. 100 texts: B is cheaper by $12.00 - 10.00 = 2.00$.

Answer: **Plan A is proportional ($k = 0.12$); A is \$2.20 cheaper at 40 texts; B is \$2.00 cheaper at 100 texts**

Problem 20 3D Printer Filament

(a) $\frac{3}{4} \div \frac{3}{2} = \frac{1}{2}$, $2 \div 4 = \frac{1}{2}$, $\frac{15}{4} \div \frac{15}{2} = \frac{1}{2}$. So $k = \frac{1}{2}$ gram per minute.

(b) $25 \times \frac{1}{2} = 12 \frac{1}{2}$.

(c) $9 \div \frac{1}{2} = 18$.

Answer: $k = \frac{1}{2}$; **12 $\frac{1}{2}$ grams; 18 minutes**