

Writing and Using $y = kx$ Equations

Grade 7 math · Worksheet Answer Key · Standards: 7.RP.A.2c

Each solution finds the constant of proportionality, writes the equation and then substitutes to answer the question. Check every division, because most errors come from dividing in the wrong order.

Standards: 7.RP.A.2c · **Level:** Grade 7

Problem 1 Car Wash Equation

The price per car is the constant, so $c = 7.5n$.

For $n = 12$: $7.5 \times 12 = 90$.

Answer: **$c = 7.5n$; \$90**

Problem 2 Pay Table Equation

$25 \div 2 = 12.5$, $62.5 \div 5 = 12.5$, $100 \div 8 = 12.5$.

Answer: **$p = 12.5h$**

Problem 3 Flour and Batches

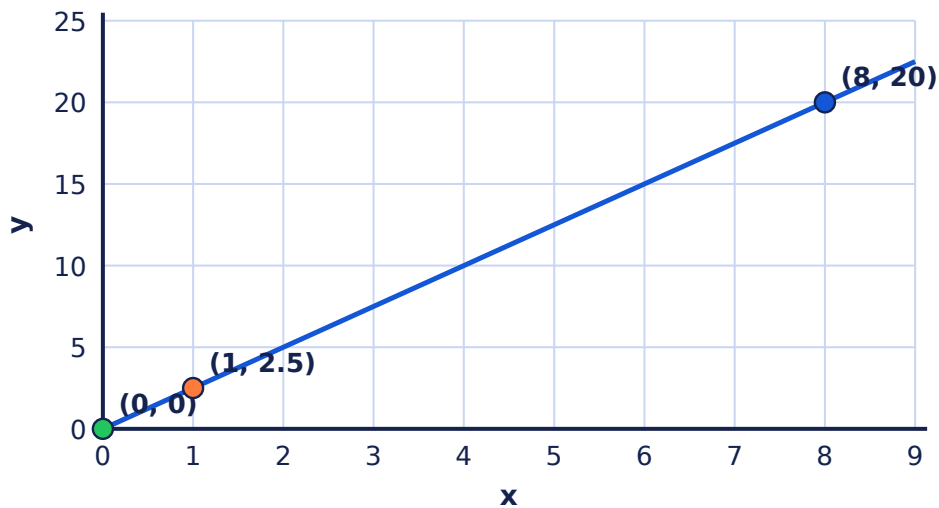
$\frac{3}{4} \div \frac{1}{2} = \frac{3}{2}$, $3 \div 2 = \frac{3}{2}$, $\frac{9}{2} \div 3 = \frac{3}{2}$.

Answer: **$f = 1.5b$**

Problem 4 Equation from a Graph

Use (8, 20): $20 \div 8 = 2.5$. Check (3, 7.5): $7.5 \div 3 = 2.5$.

Answer: **$y = 2.5x$**



At $x = 1$ the value of y is $k = 2.5$.

Problem 5 Taxi Fare per Mile

$$C = 2.2d.$$

$$2.2 \times 7.5 = 16.5.$$

Answer: **$C = 2.2d$; \$16.50**

Problem 6 Missing Values from an Equation

$$y = 6.4 \times 5 = 32.$$

$$x = 51.2 \div 6.4 = 8.$$

Answer: **$y = 32$; $x = 8$**

Problem 7 Total Cost with $t = pn$

$$t = 1.35n.$$

$$18 \text{ pens: } 1.35 \times 18 = 24.30.$$

$$\$40.50: 40.50 \div 1.35 = 30.$$

Answer: **\$24.30; 30 pens**

Problem 8 Gas Used and Miles Driven

$$2.5 \div 60 = \frac{1}{24}, 6.25 \div 150 = \frac{1}{24}, 8.75 \div 210 = \frac{1}{24}.$$

$$g = \frac{m}{24}.$$

$$372 \div 24 = 15.5 \text{ gallons.}$$

$$11 \times 24 = 264 \text{ miles.}$$

Answer: **$g = m \div 24$; 15.5 gallons; 264 miles**

Problem 9 Slow Growth Graph

$$4 \div 10 = 0.4 \text{ and } 8 \div 20 = 0.4.$$

$$y = 0.4x.$$

$$0.4 \times 35 = 14.$$

Answer: **$y = 0.4x$; $y = 14$**

Problem 10 Snail Equation

$$k = 3 \div 8 = \frac{3}{8}, \text{ so } d = \frac{3}{8}t.$$

$$20 \text{ minutes: } \frac{3}{8} \times 20 = 7.5 \text{ feet.}$$

$$12 \text{ feet: } 12 \div \frac{3}{8} = 12 \times \frac{8}{3} = 32 \text{ minutes.}$$

Answer: **$d = \frac{3}{8}t$; 7.5 feet; 32 minutes**

Problem 11 Bead Ratio Equation

$$r = \frac{7}{4}b.$$

$$20 \text{ blue: } \frac{7}{4} \times 20 = 35 \text{ red.}$$

$$56 \text{ red: } 56 \div \frac{7}{4} = 56 \times \frac{4}{7} = 32 \text{ blue.}$$

Answer: **$r = \frac{7}{4}b$; 35 red beads; 32 blue beads**

Problem 12 Which Equations Are Proportional

A proportional equation has the form $y = kx$.

(a) $k = 7$. (b) Adds 7, so not proportional. (c) Division by x , not proportional. (d) $k = 0.7$.

Answer: **(a) and (d) are proportional**

Problem 13 One Point Gives the Equation

$$k = 20 \div 16 = 1.25.$$

$$y = 1.25x.$$

$$1.25 \times 44 = 55.$$

Answer: **$y = 1.25x$; $y = 55$**

Problem 14 Interpreting an Equation

55 is the unit rate: 55 miles per hour.

(1, 55): in 1 hour the bus travels 55 miles.

(3, 165): $55 \times 3 = 165$, so in 3 hours the bus travels 165 miles.

Answer: **55 miles per hour; (1, 55) is the unit rate; (3, 165) is the distance after 3 hours**

Problem 15 Biking Speed Comparison

Marco: $21 \div 2 = 10.5$, $31.5 \div 3 = 10.5$, $52.5 \div 5 = 10.5$, so $d = 10.5t$.

Jenna: $11.5 > 10.5$, so she is faster.

After 4 hours: Jenna 46 miles, Marco 42 miles. $46 - 42 = 4$.

Answer: **Jenna is faster; she is 4 miles ahead after 4 hours**

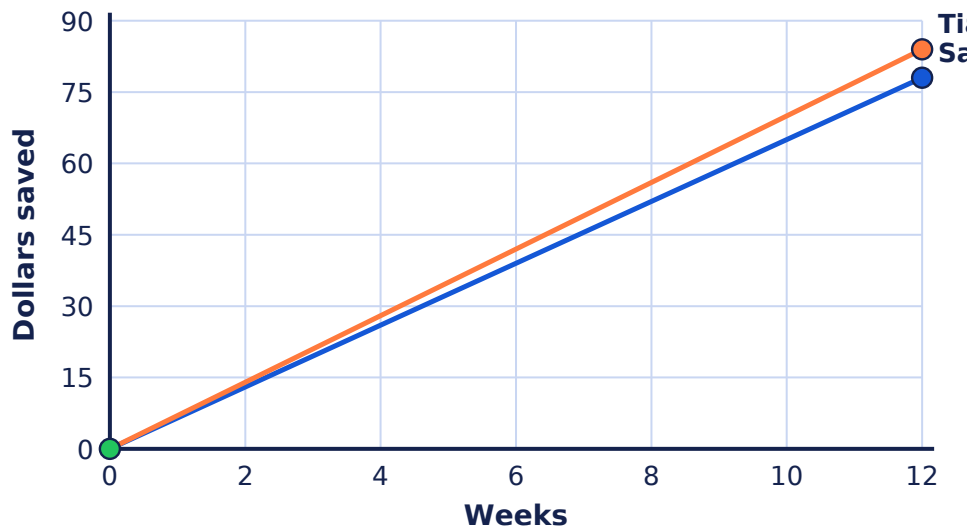
Problem 16 Savings Graph Versus Equation

Sam: $32.5 \div 5 = 6.5$, so $y = 6.5x$.

Tia saves 7 per week, which is 0.50 more than Sam.

After 12 weeks: Sam $6.5 \times 12 = 78$, Tia $7 \times 12 = 84$, and $84 - 78 = 6$.

Answer: **Tia saves more per week; she has \$6 more after 12 weeks**



After 12 weeks, Tia is ahead by 6 dollars.

Problem 17 Two Printers

P: $24 \div 2 = 12$, so $p = 12m$. Q: $39 \div 3 = 13$, so $p = 13m$.

P needs $156 \div 12 = 13$ minutes. Q needs $156 \div 13 = 12$ minutes.

Answer: **$p = 12m$ and $p = 13m$; Q finishes 1 minute sooner**

Problem 18 Trip Fuel Cost

Hybrid: $270 \div 45 = 6$ gallons, cost $6 \times 3.60 = \$21.60$.

Truck: $6 \div 90 = \frac{1}{15}$ and $9 \div 135 = \frac{1}{15}$, so $g = m \div 15$. For 270 miles, $270 \div 15 = 18$ gallons, cost $18 \times 3.60 = \$64.80$.

$64.80 - 21.60 = 43.20$.

Answer: **The truck costs \$43.20 more**

Problem 19 Sales Tax Equation

$t = 0.0825p$.

\$64: tax = $0.0825 \times 64 = 5.28$, total = $64 + 5.28 = 69.28$.

Tax \$9.90: $p = 9.90 \div 0.0825 = 120$.

Answer: **$t = 0.0825p$; tax \$5.28, total \$69.28; price \$120**

Problem 20 Equation from Two Points

$14 \div 8 = 1.75$ and $35 \div 20 = 1.75$, so $k = 1.75 = \frac{7}{4}$.

$$y = 1.75x.$$

$$52 \times 1.75 = 91.$$

$$105 \div 1.75 = 60.$$

Answer: **$y = 1.75x$; $y = 91$; $x = 60$**