

Writing and Using $y = kx$ Equations

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

Name: _____ Date: _____ Class: _____

These 20 problems train standard 7.RP.A.2c: writing equations such as $y = kx$ and $t = pn$ for proportional relationships, and using them to find missing values.

You will read equations from tables, graphs and stories, and finish by comparing relationships that appear in different forms. Always find k first and check a second pair.

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

Problem 1 Car Wash Equation (easy)

A car wash charges \$7.50 per car. Write an equation for the total income c from n cars, then find the income from 12 cars.

Problem 2 Pay Table Equation (easy)

The table shows pay for hours worked. Write an equation relating pay p to hours h .

Hours (h)	2	5	8
Pay in \$ (p)	25	62.50	100

Pay table for Problem 2.

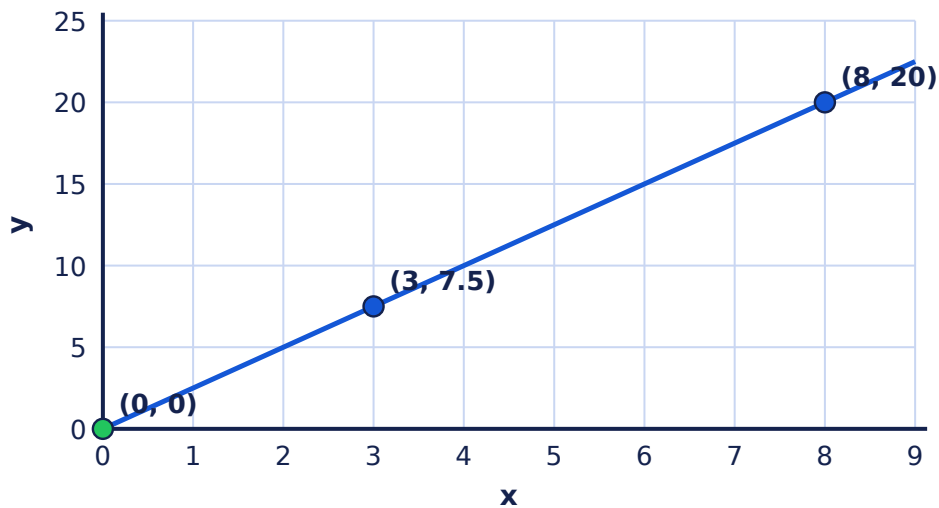
Problem 3 Flour and Batches (easy)

A recipe's flour f (cups) depends on the number of batches b . Write the equation from the table.

Batches (b)	$\frac{1}{2}$	2	3
Flour (f)	$\frac{3}{4}$	3	$\frac{9}{2}$

Problem 4 Equation from a Graph (easy)

Study this line, which passes through the points $(0, 0)$, $(3, 7.5)$ and $(8, 20)$. Write the equation that models it.



Graph for Problem 4.

Problem 5 Taxi Fare per Mile (easy)

A shuttle charges \$2.20 per mile. Write an equation for the cost C of a trip of d miles. What does a 7.5-mile trip cost?

Problem 6 Missing Values from an Equation (easy)

The equation $y = 6.4x$ is given. Find y when $x = 5$, and find x when $y = 51.2$.

Problem 7 Total Cost with $t = pn$ (medium)

Pens cost \$1.35 each. Use $t = pn$ to find the cost of 18 pens, and the number of pens that \$40.50 buys.

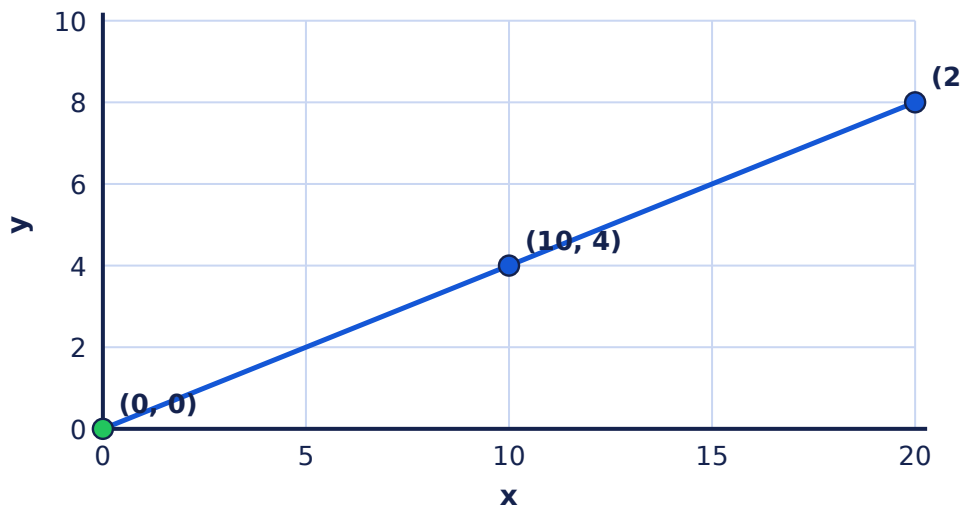
Problem 8 Gas Used and Miles Driven (medium)

A car's gasoline use is recorded. Write an equation for gallons g in terms of miles m , then find the gallons for 372 miles and the miles for 11 gallons.

Miles (m)	60	150	210
Gallons (g)	2.5	6.25	8.75

Problem 9 Slow Growth Graph (medium)

The graph shows a proportional relationship. Write the equation and find y when $x = 35$.



Graph for Problem 9.

Problem 10 Snail Equation (medium)

A snail crawls 3 feet in 8 minutes at a constant speed. Write an equation for the distance d in terms of time t . How far does it crawl in 20 minutes? How long does it need for 12 feet?

Problem 11 Bead Ratio Equation (medium)

A necklace has 4 blue beads for every 7 red beads. Write an equation for the number of red beads r in terms of blue beads b . How many red beads go with 20 blue beads? How many blue beads go with 56 red beads?

Problem 12 Which Equations Are Proportional (medium)

Which equations represent proportional relationships? Name k for each one that does.

- a. $y = 7x$
- b. $y = x + 7$
- c. $y = 7 \div x$
- d. $y = 0.7x$

Problem 13 One Point Gives the Equation (medium)

The quantity y is proportional to x , and $y = 20$ when $x = 16$. Write the equation, then find y when $x = 44$.

Problem 14 Interpreting an Equation (medium)

The equation $d = 55t$ gives the miles d a bus travels in t hours. Explain what 55 means, what

the point (1, 55) means, and what the point (3, 165) means.

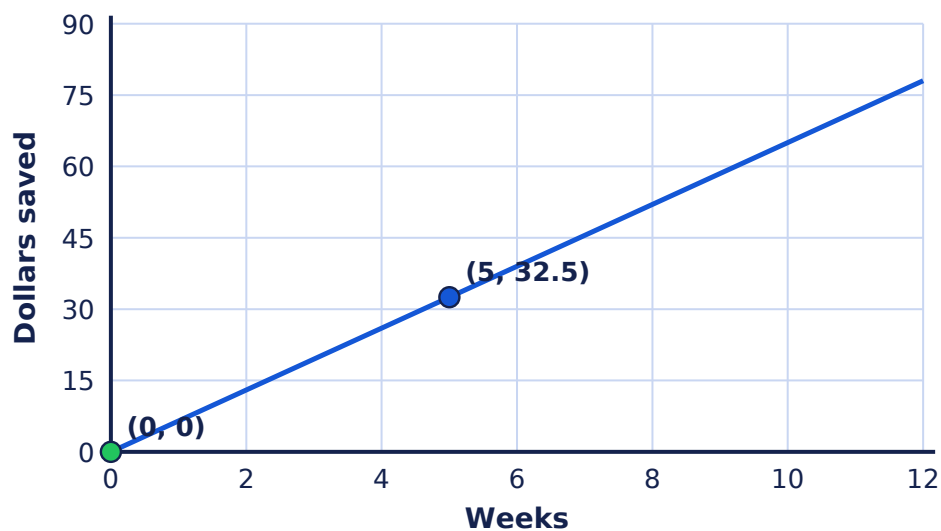
Problem 15 Biking Speed Comparison (hard)

Jenna's bike distance follows $d = 11.5t$ (miles, hours). Marco's distances are in the table. Who rides faster, and by how many miles is Jenna ahead or behind after 4 hours?

Hours (t)	2	3	5
Miles (d)	21	31.5	52.5

Problem 16 Savings Graph Versus Equation (hard)

Sam's savings are shown in the graph. Tia saves according to $y = 7x$. Who saves more per week? How much more will Tia have after 12 weeks?



Sam's savings for Problem 16.

Problem 17 Two Printers (hard)

Printer P prints 24 pages in 2 minutes. Printer Q prints 39 pages in 3 minutes. Write an equation for each (pages p , minutes m), then compare how long each needs for a 156-page report.

Problem 18 Trip Fuel Cost (hard)

A hybrid car uses gallons $g = m \div 45$ for m miles. A truck uses 6 gallons for 90 miles and 9 gallons for 135 miles. Gas costs \$3.60 per gallon. How much more does a 270-mile trip cost in the truck?

Problem 19 Sales Tax Equation (hard)

A city's sales tax is 8.25% of the price. Write an equation for the tax t on a price p . Find the tax and the total cost of a \$64 purchase, and the price of an item with \$9.90 in tax.

Problem 20 Equation from Two Points (hard)

Two points of a proportional relationship are (8, 14) and (20, 35). Show that y is proportional to x , write the equation, and find y when $x = 52$ and x when $y = 105$.