

## Proportional Relationships

Answer key

7.RP.A.2

13 problems

1. In a proportional relationship,  $y = 12$  when  $x = 3$ . Find the constant of proportionality  $k$ .

**Answer**  $k = 4$

$$k = \frac{y}{x} = \frac{12}{3} = 4.$$

2. The table shows a proportional relationship. Find  $k$ .

|     |    |    |    |
|-----|----|----|----|
| $x$ | 2  | 5  | 8  |
| $y$ | 10 | 25 | 40 |

**Answer**  $k = 5$

Each ratio is the same:  $\frac{10}{2} = \frac{25}{5} = \frac{40}{8} = 5$ , so  $k = 5$ .

3. A relationship is given by  $y = 7x$ . What is the constant of proportionality?

**Answer**  $k = 7$

An equation in the form  $y = kx$  shows  $k$  directly. Here  $k = 7$ .

4. Decide whether the table represents a proportional relationship. Explain.

|     |   |   |    |
|-----|---|---|----|
| $x$ | 1 | 2 | 3  |
| $y$ | 4 | 8 | 15 |

**Answer** No, it is not proportional

$\frac{4}{1} = 4$  and  $\frac{8}{2} = 4$ , but  $\frac{15}{3} = 5$ . The ratios are not all equal, so it is not proportional.

5. A line passes through the origin on a graph of distance vs. time. It also passes through the point (4, 18). Find the constant of proportionality.

**Answer**  $k = \frac{9}{2}$

Through the origin means  $y = kx$ , so  $k = \frac{y}{x} = \frac{18}{4} = \frac{9}{2}$ .

6. A proportional relationship has  $k = 6$ . Write its equation, then find  $y$  when  $x = 9$ .

**Answer**  $y = 6x$ ;  $y = 54$

With  $k = 6$  the equation is  $y = 6x$ . Then  $y = 6 \times 9 = 54$ .

7. Which equation represents a proportional relationship?

**Answer** B)  $y = 5x$

Proportional relationships have the form  $y = kx$  (line through the origin). Only  $y = 5x$  fits.

8. The cost  $c$  of  $n$  notebooks is proportional, and 5 notebooks cost \$6. Find  $k$  and write the equation for  $c$  in terms of  $n$ .

**Answer**  $k = \$1.20$ ;  $c = 1.2n$

$k = \frac{c}{n} = \frac{\$6}{5} = \$1.20$  per notebook, so  $c = 1.2n$ .

9. A graph of a proportional relationship passes through (3, 2). What is  $k$ , and through what other labeled point must the line pass when  $x = 9$ ?

**Answer**  $k = \frac{2}{3}$ ; the point (9, 6)

$k = \frac{2}{3}$ . When  $x = 9$ ,  $y = \frac{2}{3} \times 9 = 6$ , giving (9, 6).

---

10. Two machines fill bottles. Machine A fills  $y = 15x$  bottles in  $x$  minutes. Machine B fills 90 bottles in 5 minutes. Which machine has the larger constant of proportionality?

**Answer** Machine B

Machine A:  $k = 15$ . Machine B:  $k = \frac{90}{5} = 18$ . Since  $18 > 15$ , Machine B is faster.

---

11. On a proportional graph, the point (1,  $k$ ) always lies on the line. For the relationship through the origin and (6, 9), what are the coordinates of that point?

**Answer** (1, 1.5)

$k = \frac{9}{6} = \frac{3}{2} = 1.5$ . The point (1,  $k$ ) is (1, 1.5).

---

12. A car travels at a constant rate, going 200 miles on 8 gallons of gas. Write an equation relating distance  $d$  to gallons  $g$ , then find how far it goes on 14 gallons.

**Answer**  $d = 25g$ ; 350 miles

$k = \frac{200}{8} = 25$  miles per gallon, so  $d = 25g$ . Then  $d = 25 \times 14 = 350$  miles.

---

13. A printing service charges proportionally to the number of flyers. The graph passes through the origin and through (50, 20). Find the cost per flyer, then the cost of 325 flyers.

**Answer** \$0.40 per flyer; \$130

$k = \frac{\$20}{50} = \$0.40$  per flyer. For 325 flyers:  $\$0.40 \times 325 = \$130$ .