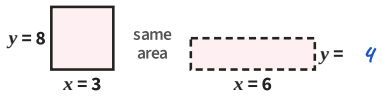
Inverse Proportion: y = k/x

ANSWERS

1

y is inversely proportional to x. When $x = 3$, $y = 8$. Find y when $x = 6$.



Statement $y \propto \frac{1}{x}$

Replace $\propto$ with $= k$ $y = \frac{k}{x}$

Substitute $8 = \frac{k}{3}$

Find k $k = 8 \times 3 = 24$

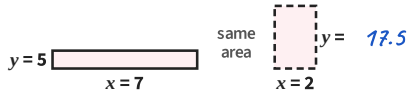
Formula $y = \frac{24}{x}$

Use it $y = \frac{24}{6}$

$y = 4$

2

y is inversely proportional to x. When $x = 7$, $y = 5$. Find y when $x = 2$.



Statement $y \propto \frac{1}{x}$

Replace $\propto$ with $= k$ $y = \frac{k}{x}$

Substitute $5 = \frac{k}{7}$

Find k $k = 5 \times 7 = 35$

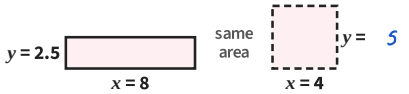
Formula $y = \frac{35}{x}$

Use it $y = \frac{35}{2}$

$y = 17.5$

3

y is inversely proportional to x. When $x = 8$, $y = 2.5$. Find y when $x = 4$.



Statement $y \propto \frac{1}{x}$

Replace $\propto$ with $= k$ $y = \frac{k}{x}$

Substitute $2.5 = \frac{k}{8}$

Find k $k = 2.5 \times 8 = 20$

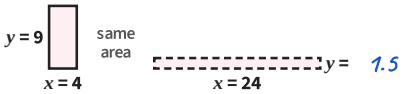
Formula $y = \frac{20}{x}$

Use it $y = \frac{20}{4}$

$y = 5$

4

y is inversely proportional to x. When $x = 4$, $y = 9$. Find y when $x = 24$.



Statement $y \propto \frac{1}{x}$

Replace $\propto$ with $= k$ $y = \frac{k}{x}$

Substitute $9 = \frac{k}{4}$

Find k $k = 9 \times 4 = 36$

Formula $y = \frac{36}{x}$

Use it $y = \frac{36}{24}$

$y = 1.5$

5

P is inversely proportional to Q.
When $Q = 5$, $P = 12$. Find Q when $P = 4$.

Statement $P \propto \frac{1}{Q}$

Replace $\propto$ with $= k$ $P = \frac{k}{Q}$

Substitute $12 = \frac{k}{5}$

Find k $k = 12 \times 5 = 60$

Formula $P = \frac{60}{Q}$

Use it $4 = \frac{60}{Q}$, $Q = 15$

$Q = 15$

6

The time, t hours, a phone battery lasts is inversely proportional to the power it uses, P watts. Using 2 watts it lasts 15 hours.

(a) Find a formula for t in terms of P.
(b) How long does it last using 2.5 watts?

$k = 15 \times 2 = 30$

(a) $t = \frac{30}{P}$

(b) $t = \frac{30}{2.5}$

Answer (a) $t = \frac{30}{P}$ (b) 12 hours

7

y is inversely proportional to x. When $x = 4$, $y = 10$. Ali writes $10 = \frac{k}{4}$, so $k = 10 \div 4 = 2.5$.

Explain Ali's mistake, then find y when $x = 5$.

k is divided by 4, so multiply: $k = 10 \times 4$

$k = 40$, $y = 40 \div 5$

$y = 8$

8

y is inversely proportional to x.

Complete the table, then write y in terms of x.

x	2	5	12
y	15	6	2.5

$k = 2 \times 15 = 30$

Formula $y = \frac{30}{x}$

Inverse Proportion: y = k/x *further practice*

ANSWERS

9

y is inversely proportional to x.
When $x = 15$, $y = 1.2$. Find y when $x = 4$.

$k = 1.2 \times 15 = 18$

$y = 18 \div 4$

$y =$ 4.5

10

The number of days, d, a bag of bird seed lasts is inversely proportional to the number of birds, b, that feed on it. It lasts 12 days for 20 birds.
How many birds would make it last 15 days?

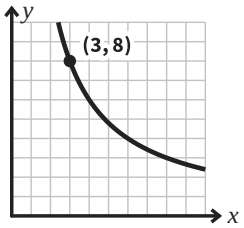
$k = 12 \times 20 = 240$

$15 = 240 \div b$

Answer 16 birds

11

The graph of $y = \frac{k}{x}$ passes through (3, 8). Find k, then find y when $x = 12$.



$k = 3 \times 8 = 24$

$y = 24 \div 12$

$y =$ 2

12

The time for a journey, t hours, is inversely proportional to the average speed, s km/h. At 60 km/h it takes 2 hours 15 minutes. How long does it take at 75 km/h? Give your answer in hours and minutes.

$k = 2.25 \times 60 = 135$

$t = 135 \div 75 = 1.8$ hours

Answer 1 hour 48 minutes

13

The time a job takes, t days, is inversely proportional to the number of machines, n. With 5 machines it takes 18 days. It must be finished in 12 days.
How many machines are needed?

$k = 18 \times 5 = 90$

$12 = 90 \div n$, $n = 7.5$

Answer 8 machines

14

y is inversely proportional to x.
When $x = 6$, $y = a$. When $x = 9$, $y = a - 4$. Find a.

$k = 6a = 9(a - 4)$

$6a = 9a - 36$, $3a = 36$

$a =$ 12

15

Is y inversely proportional to x?
Explain how you know.

x	2	3	6
y	9	6	1

$x \times y = 18$, 18, 6

not the same each time

Answer No

16

y is inversely proportional to x.
Mia says, "If x goes up by 2, y goes down by 2." Is she right?
Explain, using an example.

$y = 24/x$: $x = 2$, $y = 12$; $x = 4$, $y = 6$

y went down by 6, not 2

Answer No: double x, y halves