Inverse proportion: y = k/x

ANSWERS

1

y is inversely proportional to x.
When $x = 4$, $y = 6$. Write a formula for y in terms of x.

$y \propto \frac{1}{x}$ $\quad y = \frac{k}{x}$

$6 = \frac{k}{4}$

$k = 6 \times 4 = 24$

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

2

y is inversely proportional to x.
When $x = 3$, $y = 10$. Write a formula for y in terms of x.

$y \propto \frac{1}{x}$ $\quad y = \frac{k}{x}$

$10 = \frac{k}{3}$

$k = 10 \times 3 = 30$

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

3

T is inversely proportional to n.
When $n = 5$, $T = 8$. Write a formula for T in terms of n.

$T \propto \frac{1}{n}$ $\quad T = \frac{k}{n}$

$8 = \frac{k}{5}$

$k = 8 \times 5 = 40$

$T = \frac{40}{n}$

4 *Notice the change!*

y is inversely proportional to x.
When $x = 2$, $y = 18$. Find y when $x = 9$.

$y \propto \frac{1}{x}$ $\quad y = \frac{k}{x}$

$18 = \frac{k}{2}$

$k = 18 \times 2 = 36$

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

$y = \frac{36}{9} = 4$

5

y is inversely proportional to x.
When $x = 5$, $y = 12$. Find y when $x = 4$.

$y \propto \frac{1}{x}$ $\quad y = \frac{k}{x}$

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

$k = 12 \times 5 = 60$

$y = \frac{60}{x}$

$y = \frac{60}{4} = 15$

6

P is inversely proportional to Q.
When $Q = 6$, $P = 8$. Find P when $Q = 12$.

$P = \frac{k}{Q}$

$8 = \frac{k}{6}$

$k = 8 \times 6 = 48$

$P = \frac{48}{12} = 4$

$P =$ 4

7 *Notice the change!*

y is inversely proportional to x.
When $x = 4$, $y = 9$. Find x when $y = 12$.

$y \propto \frac{1}{x}$ $\quad y = \frac{k}{x}$

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

$k = 9 \times 4 = 36$

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

$12 = \frac{36}{x}$

$x = \frac{36}{12} = 3$

8

The time, t hours, to paint a fence is inversely proportional to the number of painters, n. 3 painters take 8 hours.
How many painters would take 6 hours?

$t = \frac{k}{n}$

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

$k = 8 \times 3 = 24$

$n = \frac{24}{6} = 4$

Answer 4 painters

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

ANSWERS

9

y is inversely proportional to x.
When $x = 6$, $y = 10$. Find y when $x = 15$.

$10 = \frac{k}{6}$

$k = 10 \times 6 = 60$

$y = \frac{60}{15} = 4$

Answer $y = 4$

10

y is inversely proportional to x.
When $x = 4$, $y = 5$. Find y when $x = 8$.

$5 = \frac{k}{4}$

$k = 5 \times 4 = 20$

$y = \frac{20}{8} = 2.5$

Answer $y = 2.5$

11

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

x	2	4	5
y	30	15	12

$2 \times 30 = 60$, $4 \times 15 = 60$

$5 \times 12 = 60$: always 60

Answer Yes

12

The time, t minutes, to fill a paddling pool is inversely proportional to the number of hoses, h. With 4 hoses it takes 90 minutes. How long does it take with 6 hoses?

$90 = \frac{k}{4}$

$k = 90 \times 4 = 360$

$t = \frac{360}{6} = 60$

Answer 60 minutes

13

y is inversely proportional to x.
When $x = 2.5$, $y = 8$. Find x when $y = 5$.

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

$k = 8 \times 2.5 = 20$

$x = \frac{20}{5} = 4$

Answer $x = 4$

14

A prize fund is shared equally.
Each share, s pounds, is inversely proportional to the number of winners, w. With 8 winners each share is £150. How many winners are there when each share is £100?

$150 = \frac{k}{8}$

$k = 150 \times 8 = 1200$

$w = \frac{1200}{100} = 12$

Answer 12 winners

15

y is inversely proportional to x.
When $x = 3$, $y = 20$. Mo says that when $x = 6$, $y = 40$. Explain Mo's mistake and find the right value of y.

Mo used direct proportion: as x doubles, y halves

$k = 60$, $y = \frac{60}{6} = 10$

Answer $y = 10$

16

y is inversely proportional to x.
When $x = 2$, $y = 32$. Find the positive value of x for which $y = 4x$.

$y = \frac{64}{x}$

$\frac{64}{x} = 4x$

$4x^2 = 64$, $x^2 = 16$

Answer $x = 4$