Proportion with Squares, Cubes and Roots

1

y is directly proportional to the square of x. When $x = 2, y = 20$. Find y when $x = 3$.

x	2	3
x^2		
y	20	?

× ☐

Statement $y \propto$ ☐

Replace $\propto$ with $= k$ $y = k$ ☐

Substitute ☐ $= k \times$ ☐^{2}

Find k $k =$ ☐

Formula $y =$ ☐ x^2

Use it $y =$ ☐ × ☐^{2}

$y =$ _____

2

y is directly proportional to the square of x. When $x = 3, y = 18$. Find y when $x = 5$.

x	3	5
x^2		
y	18	?

× ☐

Statement $y \propto x^2$

Replace $\propto$ with $= k$ $y = k$ ☐

Substitute ☐ $= k \times$ ☐^{2}

Find k $k =$ ☐

Formula $y =$ ☐ x^2

Use it $y =$ ☐ × ☐^{2}

$y =$ _____

3

y is directly proportional to the square of x. When $x = 4, y = 112$. Find y when $x = 1.5$.

x	4	1.5
x^2		
y	112	?

× ☐

Statement $y \propto x^2$

Replace $\propto$ with $= k$ $y = k$ ☐

Substitute ☐ $= k \times$ ☐^{2}

Find k $k =$ ☐

Formula $y =$ ☐ x^2

Use it $y =$ ☐ × ☐^{2}

$y =$ _____

4

y is directly proportional to the cube of x. When $x = 2, y = 40$. Find y when $x = 3$.

x	2	3
x^3		
y	40	?

× ☐

Statement $y \propto x^3$

Replace $\propto$ with $= k$ $y = k$ ☐

Substitute ☐ $= k \times$ ☐^{3}

Find k $k =$ ☐

Formula $y =$ ☐ x^3

Use it $y =$ ☐ × ☐^{3}

$y =$ _____

5

y is directly proportional to the square root of x. When $x = 49, y = 21$. Find y when $x = 16$.

Statement _____

Replace $\propto$ with $= k$ _____

Substitute _____

Find k _____

Formula _____

Use it _____

$y =$ _____

6

y is inversely proportional to the square of x. When $x = 4, y = 3$. Find y when $x = 2$.

_____

_____

$y =$ _____

7

y is directly proportional to x^2. When $x = 5$, $y = 50$. Find the positive value of x when $y = 98$.

_____

_____

$x =$ _____

8

y is directly proportional to x^2. When $x = 3$, $y = 36$. Ben writes $36 = 3k$, so $k = 12$, and when $x = 4, y = 48$. Explain Ben's mistake, then find the right value of y.

_____

_____

$y =$ _____

Proportion with Squares, Cubes and Roots *further practice*

9

y is directly proportional to x^2.
When $x = 3$, $y = 4.5$. Find y when $x = 8$.

$y =$ _____

10

The cost, C pounds, of a round rug is directly proportional to the square of its diameter, d metres. A rug 1.2 m across costs £72. Find the cost of a rug 1.5 m across.

Answer _____

11

The distance you can see to the horizon, d km, is directly proportional to the square root of your height above the sea, h m. From 25 m you can see 18 km. (a) How far can you see from 64 m? (b) How high must you be to see 27 km?

Answer _____

12

The brightness, B, of a lamp is inversely proportional to the square of the distance from it, d metres. At 2 m the brightness is 45.
Find the brightness at 3 m.

$B =$ _____

13

y is directly proportional to x^3.
Complete the table.

x	2	4	
y	4		108

Answer _____

14

y is directly proportional to x^2.
When $x = 4$, $y = p$. When $x = 6$, $y = p + 30$. Find p.

$p =$ _____

15

y is inversely proportional to x^2.
When $x = 6$, $y = 2.5$. Find the positive value of x when $y = 10$.

$x =$ _____

16

y is directly proportional to x^3.
Lily says, "If x doubles, y doubles too."
Is she right? Explain.

Answer _____