Proportion with square roots

Grade 7 | Higher | 10 questions, 35 marks

GCSE Maths topic practice

Scan for the solutions

Name: _____ **Date:** _____ **Score:** _____ **/ 35**

1 y is directly proportional to the square root of x.

When $x = 9$, $y = 12$.

Find a formula for y in terms of x.

(2 marks)

Answer _____

2 y is directly proportional to $\sqrt{x}$.

When $x = 25$, $y = 10$.

a. Find a formula for y in terms of x.

b. Find the value of y when $x = 64$.

c. Find the value of x when $y = 30$.

(4 marks)

Answer _____

3 Here are descriptions of four sketch graphs. Each is drawn for $x > 0$.

Graph A: a straight line through the origin, sloping upwards.

Graph B: a curve starting at the origin that rises steeply at first and then flattens out, still rising, as x increases.

Graph C: a curve starting at the origin that rises slowly at first and then gets steeper and steeper as x increases.

Graph D: a curve that falls as x increases, getting closer and closer to the x-axis but never touching either axis.

a. Write down the letter of the graph that could be $y = k\sqrt{x}$, where $k > 0$.

b. Write down the letter of the graph that could be $y = \frac{k}{\sqrt{x}}$, where $k > 0$.

(2 marks)

Answer _____

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

4 y is inversely proportional to the square root of x.

When $x = 16$, $y = 5$.

a. Find a formula for y in terms of x.

b. Find the value of y when $x = 100$.

c. Find the value of x when $y = 8$.

(4 marks)

Answer _____

5 The time, T seconds, for one swing of a pendulum is directly proportional to the square root of its length, L cm.

A pendulum of length 100 cm takes 2 seconds for one swing.

a. Find a formula for T in terms of L.

b. Find the time for one swing of a pendulum of length 225 cm.

c. Priya wants a pendulum that takes 2.4 seconds for one swing. Find, in cm, the length she should use.

(4 marks)

Answer _____

6 y is directly proportional to the square root of x.

Here is a table of values for x and y. Three of the values are missing.

x	4	25	(b)	144
y	6	(a)	24	(c)

Complete the table by finding the missing values.

a. the value of y when $x = 25$

b. the value of x when $y = 24$

c. the value of y when $x = 144$

(3 marks)

Answer _____

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

7 The speed, v metres per second, of a wave in shallow water is directly proportional to the square root of the depth of the water, d metres.

When the depth is 6.25 metres, the speed of the wave is 7.5 metres per second.

a. Find a formula for v in terms of d.

b. Find, in metres, the depth of the water when the speed of the wave is 10.5 metres per second.

(3 marks)

Answer _____

8 y is directly proportional to the square root of x.

a. x is multiplied by 4. Write down the number that y is multiplied by.

b. x is increased by 44%. Work out the percentage increase in y.

w is inversely proportional to the square root of x.

c. x is decreased by 36%. Work out the percentage increase in w.

(4 marks)

Answer _____

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

9 Here is a table of values for x and y.

x	4	16	100
y	10	5	2

Exactly one of these statements is true.

A: y is directly proportional to x.

B: y is directly proportional to $\sqrt{x}$.

C: y is inversely proportional to x.

D: y is inversely proportional to $\sqrt{x}$.

E: y is inversely proportional to x^2.

a. Write down the letter of the true statement.

b. Find a formula for y in terms of x.

c. Find the value of y when $x = 400$.

(4 marks)

Answer _____

10 y is inversely proportional to the square root of x.

When $x = 2.25$, $y = 4$.

a. Find the value of y when $x = 0.09$.

b. Find the value of x when $y = 15$.

c. Find the value of x for which $y = x$. Give your answer correct to 3 significant figures.

(5 marks)

Answer _____

End of questions | Total 35 marks

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.