Lesson 3

Proportionality : GCSE

3.1 The Constant of a Proportionality

3.2 Exercise

Question 1

$$y = 8\sqrt{x}$$

(i) Tick which applies

☐ y is directly proportional to the square root of x

☐ y is inversely proportional to the square root of x

(ii) What is the constant of the proportionality ?

(iii) When $x = 25$, what is y ?

(iv) When $x = 400$, what is y ?

(v) If the value of x was increased, would the value of y increase or decrease ?

Question 2

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

(i) Tick which applies

☐ y is directly proportional to the square root of x

☐ y is inversely proportional to the square root of x

(ii) What is the constant of the proportionality ?

(iii) When $x = 64$, what is y ?

(iv) When $x = 100$, what is y ?

(v) If the value of x was increased, would the value of y increase or decrease ?

Question 3

(i) Write down the equation described by,

y is directly proportional to the square root of x

The constant of the proportionality is 15

(ii) When $x = 64$, what is y ?

(iii) When $x = 144$, what is y ?

Question 4

(i) Write down the equation described by,

y is inversely proportional to the square root of x

The constant of the proportionality is 21

(ii) When $x = 9$, what is y ?

(iii) When $x = 49$, what is y ?

Question 5

(i) Write down the equation described by,

y is directly proportional to x

The constant of the proportionality is k

(ii) If $x = 9$ when y is 18, what is the value of k ?

(iii) Rewrite your part **(i)** answer with k replaced with its constant fixed value.

(iv) When x is 5, what is y ?

Question 6

(i) Write down the equation described by,

y is directly proportional to the square root of x

The constant of the proportionality is k

(ii) If $x = 9$ when y is 30, what is the value of k ?

(iii) Rewrite your part **(i)** answer with k replaced with its constant fixed value.

(iv) When x is 25, what is y ?

Question 7

(i) Write down the equation described by,

y is directly proportional to the square of x

The constant of the proportionality is k

(ii) If $x = 4$ when y is 64, what is the value of k ?

(iii) Rewrite your part **(i)** answer with k replaced with its constant fixed value.

(iv) When x is 10, what is y ?

Question 8

The formula for the area of a circle is $A = \pi r^2$.

(i) Tick which applies

☐ A is directly proportional to the square of r

☐ A is inversely proportional to the square of r

(ii) What is the constant of the proportionality ?

Question 9

(i) Write down the equation described by,

y is inversely proportional to x

The constant of the proportionality is k

(ii) If $x = 3$ when y is 5, what is the value of k ?

(iii) Rewrite your part **(i)** answer with k replaced with its constant fixed value.

(iv) When x is 15, what is y ?

Question 10

(i) Write down the equation described by,

y is inversely proportional to the square root of x

The constant of the proportionality is k

(ii) If $x = 9$ when y is 12, what is the value of k ?

(iii) Rewrite your part **(i)** answer with k replaced with its constant fixed value.

(iv) When x is 16, what is y ?

Question 11

Einstein's famous formula is $E = m\,c^2$.

(i) Tick which applies ☐ E is directly proportional to m

☐ E is inversely proportional to m

(ii) The constant of the proportionality is c^2.

Out of interest, do you know what the fixed number, c^2, is ?

Question 12

(i) Write down the equation described by,

$$y \text{ is inversely proportional to the square of } x$$

$$\text{The constant of the proportionality is } k$$

(ii) If $x = 3$ when y is 2, what is the value of k ?

(iii) Rewrite your part **(i)** answer with k replaced with its constant fixed value.

(iv) When x is 1, what is y ?

Question 13

(i) Write down the equation described by,

$$C \text{ is directly proportional to } r$$

$$\text{The constant of the proportionality is } 2\pi$$

(ii) You should recognise this formula.
What does this formula do ?

Question 14

(i) Write down the equation described by,

$$A \text{ is directly proportional to } b$$

$$A \text{ is directly proportional to } h$$

$$\text{The constant of the proportionality is } \frac{1}{2}$$

(ii) You should recognise this formula.
What does this formula do ?

Question 15

This question is about plotting a graph of inverse proportion for the equation

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

Complete the following table,

x	1	4	9	16
y				

Plot the graph of the equation.