



2.13 – Direct and inverse variation

Student name: _____ Score: _____

1. y varies as the square root of w .
When $w = 9$, $y = 4$.
Find the value of y when $w = 36$.

Answer $y = \frac{8}{\dots\dots\dots}$ [3]

2. y varies inversely as the square root of x .
When $x = 9$, $y = 2$.

(a) Find y in terms of x .

Answer(a) $y = \frac{6}{\sqrt{x} \dots\dots\dots}$ [2]

(b) Find y when $x = 36$.

Answer(b) $y = \frac{1}{\dots\dots\dots}$ [1]

(c) Write x in terms of y .

Answer(c) $x = \frac{36}{y^2 \dots\dots\dots}$ [3]

(d) When y is multiplied by 0.5, x is multiplied by k .
Find the value of k .

Answer(d) $\frac{4}{\dots\dots\dots}$ [2]

3. The resistance, R ohms, of a standard length of wire varies inversely as the square of its diameter, d mm.

(a) The resistance of a standard length of wire of diameter 0.5 mm is 0.8 ohms.

(i) Find a formula for R in terms of d .

Answer(a)(i) $R = \frac{0.2}{d^2 \dots\dots\dots}$ [3]

(ii) Find the resistance of a standard length of the same type of wire with diameter 2 mm.

Answer(a)(ii) $\frac{0.05}{\dots\dots\dots}$ ohms [1]

(iii) The resistance of a standard length of the same type of wire is 4 ohms.
Find the diameter of this wire.

Answer(a)(iii) $\frac{0.224}{\dots\dots\dots}$ mm [2]

(b) For a different type of wire the resistance of a standard length is 2 ohms.
Find the resistance of a standard length of this wire when the diameter is doubled.

Answer(b) $\frac{0.5}{\dots\dots\dots}$ ohms [2]



4. y varies inversely as the square root of x .
 $y = 16$ when $x = 4$.

(a) Find the value of y when $x = 16$.

Answer(a) $y = \underline{\quad 8 \quad}$ [3]

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

Answer(b) $x = \underline{\quad 0.25 \quad}$ [2]

(c) Find x in terms of y .

Answer(c) $x = \underline{\quad \frac{1024}{y^2} \text{ or } \left(\frac{32}{y}\right)^2 \quad}$ [3]

5. (a) y varies inversely as the square root of x .
 $y = 5$ when $x = 9$.

(i) Find the value of y when $x = 25$.

Answer(a)(i) $y = \underline{\quad 3 \quad}$ [2]

(ii) Find the value of x when $y = 25$.

Answer(a)(ii) $x = \underline{\quad 0.36 \quad}$ [2]

(iii) Find x in terms of y .

Answer(a)(iii) $x = \underline{\quad \frac{225}{y^2} \text{ or } \left(\frac{15}{y}\right)^2 \quad}$ [2]

6. The frequency of a radio wave, f , is inversely proportional to the wavelength, L metres.
A radio station broadcasts on a frequency of 93.7 and a wavelength of 3.2 m.

(a) Find a formula for f , in terms of L , writing any constants correct to 3 significant figures.

$f = \underline{\quad \frac{300}{L} \quad}$ [3]

(b) Chat Radio broadcasts with a wavelength of 2.8 m.

Find the frequency of Chat Radio.

$\underline{\quad 107 \quad}$ [1]

(c) Allsports Radio broadcasts with a frequency of 0.35 .

Find the wavelength of Allsports Radio.

$\underline{\quad 857 \quad}$ m [2]

