



# 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  $y = \underline{\quad 8 \quad}$  [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)  $y = \underline{\quad \frac{6}{\sqrt{x}} \quad}$  [2]

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

Answer(b)  $y = \underline{\quad 1 \quad}$  [1]

(c) Write  $x$  in terms of  $y$ .

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

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

Answer(d)  $\underline{\quad 4 \quad}$  [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 0.5mm is 0.8 ohms.

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

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

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

Answer(a)(ii)  $\underline{\quad 0.05 \quad}$  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)  $\underline{\quad 0.224 \quad}$  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)  $\underline{\quad 0.5 \quad}$  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]

