ANSWERS

Proportion – Past Paper Questions

14. *(a)* Given that y is inversely proportional to x, and that $y = 12$ when $x = 2$, find an expression for y in terms of x.

$y \propto \frac{1}{x}$ $\quad y = \frac{k}{x}$ (1)

$12 = \frac{k}{2}$ $\quad \therefore k = 24$ (1) $\quad$ So $y = \frac{24}{x}$ (1)

[3]

(b) Use the expression you found in *(a)* to complete the following table.

x	0·1	2	3
y	240	12	8

(1) (1)

$y = \frac{24}{0.1} = 240$

$8 = \frac{24}{x}$ $\quad \therefore x = 3$

[2]

12. Given that y is inversely proportional to x^2, and that $y = 4$ when $x = 5$,

(a) find an expression for y in terms of x,

$y \propto \frac{1}{x^2}$ $\quad y = \frac{k}{x^2}$ (1)

$4 = \frac{k}{25}$ $\quad \therefore k = 100$ (1) $\quad$ So $y = \frac{100}{x^2}$ (1)

[3]

(b) use the expression you found in *(a)* to complete the following table.

x	–1	5	10
y	100	4	1

(1) (1)

$y = \frac{100}{1} = 100$ $\quad y = 1 = \frac{100}{x^2}$

$\therefore x^2 = 100$ $\quad x = 10$

[2]

12. Given that y is proportional to x^2, and that $y = 4$ when $x = 0{\cdot}5$,

(a) find an expression for y in terms of x,

$y \propto x^2$ $\quad y = kx^2$ (1)

$4 = 0{\cdot}25k \quad \therefore k = 16$ (1)

So $y = 16x^2$ (1)

[3]

(b) use the expression you found in *(a)* to complete the following table.

x	0·5	3	20
y	4	144	6400

(1) (1)

$y = 16 \times 9 = 144$

$6400 = 16x^2 \quad x^2 = 400 \quad x = 20$

[2]

11. *(a)* You are given that y is inversely proportional to x^2, and that $y = 100$ when $x = 2$.

(i) Find an expression for y in terms of x.

$y \propto \frac{1}{x^2} \quad y = \frac{k}{x^2}$ (1)

$100 = \frac{k}{4} \quad \therefore k = 400$ (1) $\quad$ So $y = \frac{400}{x^2}$ (1)

(ii) Use the expression you found in (i) to complete the following table.

x	2	10	40
y	100	4	$\frac{1}{4}$

(1) (1)

$y = \frac{400}{10^2} \quad \therefore y = 4$

$\frac{1}{4} = \frac{400}{x^2} \quad \therefore x^2 = 1600 \quad x = 40$

[5]