FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

R13: Proportion equations

Construct and use equations for direct and inverse proportion

20 marks · 25 minutes · Non-calculator

1) y is directly proportional to x. When $x = 3$, $y = 15$.

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

.....

(2)

(b) Find y when $x = 8$

.....

(1)

[Question 1: 3 marks]

2) y is inversely proportional to x. When $x = 5$, $y = 4$.

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

.....

(2)

(b) Find x when $y = 2$

.....

(1)

[Question 2: 3 marks]

3) p is directly proportional to q^2. When $q = 6$, $p = 72$.

(a) Find a formula for p in terms of q.

.....

(2)

(b) Find p when $q = 10$

.....

(1)

[Question 3: 3 marks]

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4) T is inversely proportional to d^2. When $d = 2$, $T = 9$.

(a) Find a formula for T in terms of d.

.....

(2)

(b) Find T when $d = 3$

.....

(1)

[Question 4: 3 marks]

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5) y is inversely proportional to the cube of x. Write an equation for y in terms of x and a constant k.

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[Question 5: 1 marks]

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6) v is directly proportional to $\sqrt{w}$. When $w = 16$, $v = 12$.

(a) Find a formula for v in terms of w.

.....

(2)

(b) Find w when $v = 21$

.....

(1)

[Question 6: 3 marks]

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7) Complete: "x is inversely proportional to y" means that x is directly proportional to . . .

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[Question 7: 1 marks]

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8) Say what happens to y when x is doubled if

(a) y is directly proportional to x

.....

(1)

(b) y is inversely proportional to x^2

.....

(1)

[Question 8: 2 marks]

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9) Here is a table of values.

x	1	2	4
y	16	4	1

Write an equation connecting y and x.

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[Question 9: 1 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	(a) $y = 5x$ (b) 40	(a) $y = kx$, $15 = 3k$ (M1); A1. (b) B1.
2	(a) $y = \frac{20}{x}$ (b) 10	(a) $y = \frac{k}{x}$, $k = 20$ (M1); A1. (b) B1.
3	(a) $p = 2q^2$ (b) 200	(a) $72 = 36k$ (M1); A1. (b) B1.
4	(a) $T = \frac{36}{d^2}$ (b) 4	(a) $9 = \frac{k}{4}$ (M1); A1. (b) B1.
5	$y = \frac{k}{x^3}$	B1.
6	(a) $v = 3\sqrt{w}$ (b) 49	(a) $12 = 4k$ (M1); A1. (b) B1.
7	$\frac{1}{y}$	B1.
8	(a) y doubles (b) y is divided by 4	B1 each.
9	$y = \frac{16}{x^2}$	B1.