FOUNDATION & HIGHER

HIGHER EXTENDS

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

R13: Proportion equations

Solve problems by constructing equations of proportion

20 marks · 25 minutes · Non-calculator

1) Braking distance d is proportional to the square of the speed v. At 40 km/h, d = 20 m. Find d at 60 km/h.

..... m

[Question 1: 3 marks]

2) The time to paint a house is inversely proportional to the number of painters. 3 painters take 8 hours. How many painters are needed to finish in less than 3 hours?

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[Question 2: 4 marks]

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3) F is inversely proportional to d^2. $F = 36$ when $d = 2$. Find d when $F = 4$ ($d > 0$).

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[Question 3: 3 marks]

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4) The cost of a metal sphere is proportional to the cube of its radius. A sphere of radius 3 cm costs £54. Find the cost of a sphere of radius 5 cm.

£ .....

[Question 4: 3 marks]

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5) y is directly proportional to $\sqrt{x}$. $y = 6$ when $x = 9$. Find x when $y = 10$

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[Question 5: 3 marks]

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6) The period T of a pendulum is proportional to $\sqrt{L}$. A 1 m pendulum has a period of 2 s. What length gives a period of 3 s?

..... m

[Question 6: 2 marks]

7) y is inversely proportional to x. x increases by 25%. By what percentage does y decrease?

..... %

[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	45	$d = kv^2$ (P1); $k = \frac{1}{80}$ (P1); A1.
2	9	$T = \frac{24}{n}$ (P1, P1); $n > 8$ (P1); 9 (A1).
3	6	$F = \frac{144}{d^2}$ (P1); $d^2 = 36$ (P1); A1.
4	£250	$k = 2$ (P1); 2×125 (P1); A1.
5	25	$y = 2\sqrt{x}$ (P1); $\sqrt{x} = 5$ (P1); A1.
6	2.25	$(1.5)^2$ (P1); A1.
7	20%	$y \times \frac{1}{1.25} = 0.8y$ (P1); A1.