Direct and Inverse Proportion questions and answers

11 questions · Extended · 9 non-calculator · worked answers

Name _____ Date _____ Score _____

- Original questions in the style of the Cambridge 0580 papers, each labelled Core or Extended and calculator or non-calculator. Try every question before you look at the answers.
- Worked answers start after the questions. Questions with marks come from our 0580 practice bank (M method, A accuracy, B independent marks).
- Online, with more practice: igcsemathrevision.com/igcse-frontend/0580/direct-and-inverse-proportion-questions

Extended: for Papers 2 and 4

1. **Extended · non-calculator · easy**

y is directly proportional to x. When $x = 3$, $y = 12$.
Find y when $x = 7$.

2. **Extended · non-calculator · easy · 2 marks**

y is inversely proportional to x. When $x = 5$, $y = 6$.

Find y when $x = 10$.

3. **Extended · non-calculator · medium**

y varies directly as the square of x, and $y = 48$ when $x = 4$.
Work out y when $x = 5$.

4. **Extended · non-calculator · medium**

y is inversely proportional to x. When $x = 3$, $y = 8$.
Find y when $x = 6$.

5. **Extended · non-calculator · medium**

y varies inversely as the square of x, and $y = 4$ when $x = 3$.
Work out the value of y when $x = 6$.

6. **Extended · non-calculator · medium · 3 marks**

y is directly proportional to x^2. When $x = 5$, $y = 50$.

(a) Find y when $x = 3$.

(b) Find the positive value of x when $y = 72$.

7. **Extended · non-calculator · hard**

y is directly proportional to $\sqrt{x}$. When $x = 9$, $y = 12$.
Find x when $y = 20$.

8. **Extended · calculator · hard**

The time taken to build a wall is inversely proportional to the number of workers. 6 workers take 15 days.
How many days do 9 workers take?

9. **Extended · calculator · hard**

The distance, d metres, an object falls is directly proportional to the square of the time, t seconds. It falls 20 m in 2 seconds.
How far does it fall in 5 seconds?

10. **Extended · non-calculator · hard**

y is directly proportional to x^3.
When x is multiplied by 3, what is y multiplied by?

11. **Extended · non-calculator · hard · 4 marks**

y is inversely proportional to x^2. When $x = 3$, $y = 4$.

(a) Find y when $x = 6$.

(b) Find the positive value of x when $y = \frac{1}{4}$.

Answers and worked solutions

Question 1

Answer: $y = 28$

1. $y = kx$: $12 = 3k$, so $k = 4$.
2. $y = 4 \times 7 = 28$

Question 2 — 2 marks

Answer: $y = 3$

M1 $y = \frac{k}{x}$ and $k = 30$

A1 3

Question 3

Answer: $y = 75$

1. $y = kx^2$: $48 = 16k$, so $k = 3$.
2. $y = 3 \times 25 = 75$

Question 4

Answer: $y = 4$

1. $y = \frac{k}{x}$: $8 = \frac{k}{3}$, so $k = 24$.
2. $y = \frac{24}{6} = 4$

Question 5

Answer: $y = 1$

1. $y = \frac{k}{x^2}$: $4 = \frac{k}{9}$, so $k = 36$.
2. $y = \frac{36}{36} = 1$

Question 6 — 3 marks

Answer: (a) $y = 18$ (b) $x = 6$

M1 $y = kx^2$ and $k = 2$

A1 (a) 18

A1 (b) $x^2 = 36$, $x = 6$

Question 7

Answer: $x = 25$

1. $y = k\sqrt{x}$: $12 = 3k$, so $k = 4$.
2. $20 = 4\sqrt{x}$, so $\sqrt{x} = 5$ and $x = 25$.

Question 8

Answer: 10 days

1. $t = \frac{k}{w}$: $k = 6 \times 15 = 90$.
2. $t = \frac{90}{9} = 10$

Question 9

Answer: $125\ m$

1. $d = kt^2$: $20 = 4k$, so $k = 5$.
2. $d = 5 \times 25 = 125$

Question 10

Answer: 27

1. $y = kx^3$. Replacing x by $3x$ gives $k(3x)^3 = 27kx^3$.

Question 11 — 4 marks

Answer: (a) $y = 1$ (b) $x = 12$

M1 $y = \frac{k}{x^2}$ and $k = 36$

A1 (a) 1

M1 (b) $x^2 = 36 \div \frac{1}{4} = 144$

A1 $x = 12$

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