eClassroom

GCSE Mathematics

Proportion

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

k=15/5=3. y=3x.

y(8)=3×8

∴ **24**

[Fluency] Question 2

k=24/6=4. x=y/4.

x=36/4

∴ **9**

[Fluency] Question 3

k=14/2=7. y=7x.

y(5)=35; x=42/7=6

∴ **y=35 when x=5; x=6 when y=42**

[Fluency] Question 4

xy=constant=4×6=24

y=24/8

∴ **3**

[Fluency] Question 5

xy=3×12=36

x=36/4

∴ **9**

[Reasoning] Question 6

Speed=60/40×60=90km/h

Distance=90×75/60=90×1.25

∴ **112.5 km**

[Reasoning] Question 7

Total work=8×6=48 worker-days

Time=48/12

∴ **4 days**

[Reasoning] Question 8

(a) 5L=£8.00, 8L=£12.80, 12L=£19.20

(b) Yes: cost=£1.60×litres, a fixed ratio — direct proportion.

∴ **(a) £8.00, £12.80, £19.20 (b) Yes, direct proportion.**

[Problem Solving] Question 9

k=7.5/3=2.5. y=2.5x

(b) 2.5×8=20 ✓ Yes, (8,20) is on the graph.

(c) y=2.5×10=25

∴ **(a) y=2.5x (b) Yes (c) y=25**

[Problem Solving] Question 10

k=50/25=2. $C=2n^2$

(b) C(10)=2×100=200

(c) $2n^2=32 \rightarrow n^2=16 \rightarrow n=4$

∴ **(a) $C=2n^2$ (b) £200 (c) n=4**

Section B — Higher — Worked Solutions

[Fluency] Question 1

$k=36/9=4$. $y=4x^2$.

(a) $y=4\times25=100$

(b) $4x^2=100 \rightarrow x^2=25 \rightarrow x=5$

$\therefore$ **(a) 100 (b) x=5**

[Fluency] Question 2

$k=6\times4=24$. $y=24/x$.

(a) $y=24/3=8$

(b) $x=24/12=2$

$\therefore$ **(a) 8 (b) x=2**

[Fluency] Question 3

$k=12/3=4$. $y=4\sqrt{x}$.

$y=4\times\sqrt{25}=4\times5$

$\therefore$ **20**

[Reasoning] Question 4

$k=50\times4=200$. $y=200/x^2$.

(a) $y=200/25=8$

(b) $x^2=200/2=100 \rightarrow x=10$

$\therefore$ **(a) 8 (b) x=10**

[Reasoning] Question 5

$k=16/8=2$. $p=2q^3$.

$p=2\times27$

$\therefore$ **54**

[Reasoning] Question 6

$y=kx^2$. When x becomes 2x: $y=k(2x)^2=4kx^2$

$\therefore$ **y is multiplied by 4 (quadruples).**

[Reasoning] Question 7

k=8×√4=8×2=16. y=16/√x.

y=16/√9=16/3

∴ **16/3 ≈ 5.33**

[Problem Solving] Question 8

k=2/√0.25=2/0.5=4. T=4√L.

T(1)=4×1

∴ **4 s**

[Problem Solving] Question 9

$$k = \frac{F \cdot d^2}{m_1 m_2} = \frac{10 \times 1}{2 \times 5} = 1$$

$$F = \frac{m_1 m_2}{d^2} = \frac{3 \times 4}{4}$$

∴ **F = 3**

[Problem Solving] Question 10

(a) y=kx: straight line through origin, y increases linearly.

(b) y=k/x: reciprocal curve (hyperbola), y decreases as x increases.

(c) y=kx²: parabola, y increases (faster than linear) as x increases.

∴ **See sketch descriptions above.**