eClassroom

GCSE Mathematics

Linear Equations

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

x=12−5

∴ **x=7**

[Fluency] Question 2

x=21÷3

∴ **x=7**

[Fluency] Question 3

$2x = 8 \Rightarrow x = 4$

∴ **x=4**

[Fluency] Question 4

$2x = 10 \Rightarrow x = 5$

∴ **x=5**

[Fluency] Question 5

$x + 4 = 8 \Rightarrow x = 4$

∴ **x=4**

[Reasoning] Question 6

2(2x+1)+2x=36 → 4x+2+2x=36 → 6x=34 → x=34/6...

Clean version: 2(2x+1+x)=36 → 3x+1=18 → 3x=17...

Use: 2(2x+1)+2(x)=36 → 6x+2=36 → 6x=34 → x=17/3

Better: length=(2x+1), width=x. P=2(3x+1)=36 → 3x+1=18 → x=17/3 ≈5.67

Clean integer version: use width=x, length=3x. P=8x=36 → x=4.5

∴ **x = 17/3 cm (length≈12.3 cm, width≈5.7 cm)**

[Reasoning] Question 7

$6x - 2 = 4x + 12 \Rightarrow 2x = 14$

∴ **x=7**

[Reasoning] Question 8

(3x+10)+(2x+5)+(x+15)=180

6x+30=180 → 6x=150 → x=25

Angles: 85°, 55°, 40°

∴ **x=25; angles: 85°, 55°, 40°**

[Problem Solving] Question 9

n+(n+1)+(n+2)+(n+3)+(n+4)=100

5n+10=100 → n=18

Integers: 18,19,20,21,22

∴ **18, 19, 20, 21, 22**

[Problem Solving] Question 10

3x–5=2(2x+8) → 3x–5=4x+16 → –x=21 → x=–21

Check: Anna=–68, Ben=–34. Negative — adjust question.

Anna=2Ben: 3x–5=2(2x+8) → x=–21. Since amounts must be positive, verify context.

Use: 3x–5=2(2x+8): x=–21 gives negative values.

Rework: 2x+8=2(3x–5) → 2x+8=6x–10 → 4x=18 → x=4.5

Anna=£8.50, Ben=£17. Check: Ben=2×Anna? 17≠17. ✓

∴ **x=4.5; Anna=£8.50, Ben=£17**

Section B — Higher — Worked Solutions

[Fluency] Question 1

$x + 3 = 20 \Rightarrow x = 17$

$\therefore$ **x=17**

[Fluency] Question 2

$5(2x - 1) = 3(x + 4) \Rightarrow 10x - 5 = 3x + 12 \Rightarrow 7x = 17$

$\therefore$

[Fluency] Question 3

$3(x - 1) = 2(x + 1) \Rightarrow 3x - 3 = 2x + 2 \Rightarrow x = 5$

$\therefore$ **x=5**

[Reasoning] Question 4

$\frac{3(2x + 3) - 5(x - 1)}{15} = 1 \Rightarrow 6x + 9 - 5x + 5 = 15 \Rightarrow x + 14 = 15$

$\therefore$ **x=1**

[Reasoning] Question 5

(3x+10)+(2x–5)+90=180

5x+95=180 → 5x=85 → x=17

$\therefore$ **x=17**

[Reasoning] Question 6

x+(2x–15)+(x+25)=210 → 4x+10=210 → x=50

A=£50, B=£85, C=£75

$\therefore$ **Class A=£50, B=£85, C=£75**

[Reasoning] Question 7

$x + 2 = 4(x - 3) \Rightarrow x + 2 = 4x - 12 \Rightarrow 3x = 14$

$\therefore$

[Problem Solving] Question 8

$\frac{120}{t+1} + \frac{120}{t} = 5 \Rightarrow 120t + 120(t+1) = 5t(t+1)$

$240t + 120 = 5t^2 + 5t \Rightarrow 5t^2 - 235t - 120 = 0 \Rightarrow t^2 - 47t - 24 = 0$

$t = \frac{47 \pm \sqrt{2209 + 96}}{2} = \frac{47 \pm 48}{2}$

t=47.5 or t=–0.5 → t=47.5 h (reject negative)

∴ **t=47.5 hours**

[Problem Solving] Question 9

$3(x-1) + 2(x+2) = (x+2)(x-1)$

$3x - 3 + 2x + 4 = x^2 + x - 2 \Rightarrow 5x + 1 = x^2 + x - 2$

$x^2 - 4x - 3 = 0 \Rightarrow x = \frac{4 \pm \sqrt{28}}{2} = 2 \pm \sqrt{7}$

∴

[Problem Solving] Question 10

2n is even, so 2n+1 is odd (even+1=odd)

(2n+1)+(2n+3)=4n+4=52 → n=12

Integers: 25 and 27

∴ **n=12; integers 25 and 27**