



eClassroom

GCSE Mathematics

Quadratic Equations

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics



Section A — Foundation — Worked Solutions

[Fluency] Question 1

$$(x + 2)(x + 3) = 0$$

$$\therefore x = -2 \text{ or } x = -3$$

[Fluency] Question 2

$$(x - 3)(x - 4) = 0$$

$$\therefore x = 3 \text{ or } x = 4$$

[Fluency] Question 3

$$(x - 3)(x + 2) = 0$$

$$\therefore x = 3 \text{ or } x = -2$$

[Fluency] Question 4

$$x = \pm 5$$

$$\therefore x = \pm 5$$

[Fluency] Question 5

$$x(x + 3) = 0$$

$$\therefore x = 0 \text{ or } x = -3$$

[Reasoning] Question 6

$$x(x + 2) = 24 \Rightarrow x^2 + 2x - 24 = 0 \Rightarrow (x + 6)(x - 4) = 0$$

$x = 4$ (reject $x = -6$, as length must be positive)

$$\therefore x = 4 \text{ (length=6 cm, width=4 cm)}$$

[Reasoning] Question 7

$$(x - 3)(x + 3) = 0$$

$$\therefore x = \pm 3$$



**[Reasoning] Question 8**

$$n(n + 2) = 48 \Rightarrow n^2 + 2n - 48 = 0 \Rightarrow (n + 8)(n - 6) = 0$$

$$n=6 \text{ (reject } n=-8)$$

$\therefore n=6$; numbers are 6 and 8

[Problem Solving] Question 9

$$2x(x + 3) = 0 \Rightarrow x = 0 \text{ or } x = -3$$

$\therefore x=0$ or $x=-3$

[Problem Solving] Question 10

$$x^2 + (x + 3)^2 = (x + 6)^2$$

$$x^2 + x^2 + 6x + 9 = x^2 + 12x + 36 \Rightarrow x^2 - 6x - 27 = 0$$

$$(x - 9)(x + 3) = 0 \Rightarrow x = 9 \text{ (reject } x = -3)$$

$\therefore x=9$ cm



Section B — Higher — Worked Solutions

[Fluency] Question 1

$$x = \frac{-5 \pm \sqrt{25 + 24}}{4} = \frac{-5 \pm 7}{4}$$

$$\therefore x=1/2 \text{ or } x=-3$$

[Fluency] Question 2

$$x = \frac{2 \pm \sqrt{4 + 12}}{6} = \frac{2 \pm 4}{6}$$

$$\therefore x=1 \text{ or } x=-1/3$$

[Fluency] Question 3

$$(x + 3)^2 - 9 + 7 = (x + 3)^2 - 2$$

$$(x + 3)^2 = 2 \Rightarrow x = -3 \pm \sqrt{2}$$

\therefore

[Fluency] Question 4

$$2(x + 2)^2 - 8 + 3 = 2(x + 2)^2 - 5$$

$$\text{Minimum} = -5 \text{ at } x=-2$$

$$\therefore \text{Completed square: } 2(x+2)^2-5; \text{ minimum}=-5 \text{ at } x=-2$$

[Reasoning] Question 5

$$\Delta = 4 - 20 = -16 < 0 \Rightarrow \text{no real solutions } \checkmark$$

$$\therefore \text{No real solutions } \checkmark$$

[Reasoning] Question 6

$$(3x - 1)(x + 2) = 0$$

$$\therefore x=1/3 \text{ or } x=-2$$

[Reasoning] Question 7

$$\Delta = 16 - 4k = 0 \Rightarrow k = 4$$

$$\therefore k=4$$



**[Problem Solving] Question 8**

$$x = \frac{6 \pm \sqrt{36 - 8}}{2} = \frac{6 \pm \sqrt{28}}{2} = 3 \pm \sqrt{7}$$

∴

[Problem Solving] Question 9

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

$$x^2 + 2x + 1 + x^2 - 5x + 6 = 3(x^2 - x - 2)$$

$$2x^2 - 3x + 7 = 3x^2 - 3x - 6 \Rightarrow x^2 = 13 \Rightarrow x = \pm\sqrt{13}$$

∴

[Problem Solving] Question 10

(a) $\Delta = 16 - 16 = 0 \Rightarrow$ one repeated root

(b) $\Delta = 9 - 40 = -31 < 0 \Rightarrow$ no real solutions

(c) $\Delta = 25 - 24 = 1 > 0 \Rightarrow$ two real solutions

∴ **(a) 1 (repeated) (b) No solutions (c) 2 solutions**

