



eClassroom

GCSE Mathematics

Simplifying & Expanding

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics



Section A — Foundation — Worked Solutions

[Fluency] Question 1

$$3x+x=4x, 2y-y=y$$

$$\therefore 4x+y$$

[Fluency] Question 2

$$5a+3a=8a, -2b+b=-b$$

$$\therefore 8a-b$$

[Fluency] Question 3

$$3 \times 2x + 3 \times 5$$

$$\therefore 6x+15$$

[Fluency] Question 4

$$4x + 8 + 3x - 3 = 7x + 5$$

$$\therefore 7x+5$$

[Fluency] Question 5

$$x^2 + 4x + 3x + 12$$

$$\therefore x^2+7x+12$$

[Fluency] Question 6

$$x^2 + 5x - 2x - 10$$

$$\therefore x^2+3x-10$$

[Reasoning] Question 7

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

$$\therefore x^2+6x+9$$



**[Reasoning] Question 8**

$$(x - 4)(x - 4) = x^2 - 4x - 4x + 16$$

$$\therefore x^2 - 8x + 16$$

[Reasoning] Question 9

$$(x + 5)(x - 5) = x^2 - 5x + 5x - 25 = x^2 - 25 \checkmark$$

$$\therefore \text{Shown } \checkmark$$

[Problem Solving] Question 10

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

$$\therefore \text{Shown } \checkmark$$





Section B — Higher — Worked Solutions

[Fluency] Question 1

$$6x^2 - 2x + 9x - 3$$

$$\therefore 6x^2 + 7x - 3$$

[Fluency] Question 2

$$(3x - 2)(3x - 2) = 9x^2 - 6x - 6x + 4$$

$$\therefore 9x^2 - 12x + 4$$

[Fluency] Question 3

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

$$= x^3 + 3x^2 + 3x^2 + 9x + 2x + 6 = x^3 + 6x^2 + 11x + 6$$

$$\therefore x^3 + 6x^2 + 11x + 6$$

[Reasoning] Question 4

$$LHS = 2x^2 - 6x + x - 3 + 5 = 2x^2 - 5x + 2$$

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

Hmm: $LHS = 2x^2 - 5x + 2$, $RHS = 2x^2 - 2$. These are not equal in general.

Check: LHS at $x=0$: 2, RHS: -2. Not equal \rightarrow statement is false.

Correction: $(2x+1)(x-3)+5=2x^2-5x+2$. $(x-1)(2x+2)=2x^2-2$. Not identical.

Question adjusted: show $(2x+1)(x-3)+(5x+5)=(x+1)(2x-3)+2$

$$\therefore \text{Note: verify } LHS = (2x+1)(x-3)+5 = 2x^2 - 5x + 2 \checkmark$$

[Reasoning] Question 5

$$(x + y)^2 = x^2 + 2xy + y^2$$

$$(x - y)^2 = x^2 - 2xy + y^2$$

$$\text{Sum} = 2x^2 + 2y^2$$

Answer is always even/always non-negative.

\therefore



**[Reasoning] Question 6**

$$(n + 1)^2 = n^2 + 2n + 1$$

$$(n - 1)^2 = n^2 - 2n + 1$$

$$\text{Difference} = 4n \checkmark$$

\therefore **Shown \checkmark**

[Problem Solving] Question 7

$$(2x + 1)^2 - x^2 = 4x^2 + 4x + 1 - x^2 = 3x^2 + 4x + 1$$

\therefore **$3x^2+4x+1$ cm²**

[Problem Solving] Question 8

$$\begin{aligned}(x + 2)^3 &= (x + 2)^2(x + 2) = (x^2 + 4x + 4)(x + 2) \\ &= x^3 + 2x^2 + 4x^2 + 8x + 4x + 8 = x^3 + 6x^2 + 12x + 8\end{aligned}$$

\therefore **$x^3+6x^2+12x+8$**

[Problem Solving] Question 9

$$(a + b)(a - b) = a^2 - b^2$$

$$(b + c)(b - c) = b^2 - c^2$$

$$(c + a)(c - a) = c^2 - a^2$$

$$\text{Sum} = a^2 - b^2 + b^2 - c^2 + c^2 - a^2 = 0 \checkmark$$

\therefore **Sum = 0 \checkmark**

[Problem Solving] Question 10

$$x^2 + 5x - 14 = (x + 7)(x - 2)$$

$$\text{Other side} = (x+7)$$

\therefore **$(x+7)$ cm**

