GCSE Mathematics – Higher Tier

Spot the Mistake: Algebra

Solutions and mark scheme

Every question is worth 4 marks: (a) B1 for the correct line; (b) B1 for a clear explanation; (c) M1 for a correct method and A1 for the correct answer. Accept equivalent explanations and methods.

Q	(a)	(b) What went wrong	(c) Correct solution
1	Line 2	$-12 \times -1 = +12$, not -12.	$2x^3 + x^2 - 25x + 12$
2	Line 2	The pair must also add to $+1$. $8 + (-9) = -1$. Use 9 and -8.	$6x^2 + 9x - 8x - 12 =$ $3x(2x + 3) - 4(2x + 3) = (3x - 4)(2x + 3)$
3	Line 3	Dividing by a negative number reverses the inequality sign.	$x < -4$
4	Line 3	Moving $-4y$ to the other side makes it $+4y$.	$x = \dfrac{2 + 4y}{y - 3}$
5	Line 2	$3y - (-y) = 4y$, not $2y$.	$4y = 12$, $y = 3$; $2x - 3 = 1$, $x = 2$
6	Line 2	$b^2 - 4ac = 25 - 4(2)(-4) = 25 + 32 = 57$. The sign of c was lost.	$x = \dfrac{5 \pm \sqrt{57}}{4}$: $x = 3.14$ or $x = -0.64$
7	Line 3	$(x - 4)^2$ is smallest when $x = 4$, so the x-coordinate is $+4$.	$(x - 4)^2 - 13$; turning point $(4, -13)$
8	Line 1	In fg(x), g is applied first, then f.	g(2) = 5, f(5) = 13, so fg(2) = 13
9	Line 3	The coefficient of n^2 is *half* the second difference.	$2n^2$: 2, 8, 18, 32, 50; remainder 2, 1, 0, -1, $-2 = -n + 3$; nth term $2n^2 - n + 3$
10	Line 2	The perpendicular gradient is the negative reciprocal: $-\dfrac{3}{4}$.	$y - 4 = -\dfrac{3}{4}(x - 3)$, so $y = -\dfrac{3}{4}x + \dfrac{25}{4}$ (or $3x + 4y = 25$)