GCSE Mathematics – Higher Tier

Spot the Mistake: Geometry and Measures

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 1	To find a shorter side, subtract: $x^2 = 13^2 - 5^2$.	$x^2 = 169 - 25 = 144$, $x = 12\,\text{cm}$
2	Line 2	Opposite and hypotenuse use sine, not tangent.	$\sin\theta = \frac{7}{12}$, $\theta = 35.7°$
3	Line 3	$176\cos 40°$ must be worked out first and then subtracted from 185.	$a^2 = 185 - 134.82 = 50.18$, $a = 7.08\,\text{cm}$
4	Line 1	The area formula uses sine, not cosine.	$\frac{1}{2} \times 9 \times 14 \times \sin 110° = 59.2\,\text{cm}^2$
5	Line 2	Opposite angles in a cyclic quadrilateral add up to 180°.	$180° - 72° = 108°$
6	Line 3	The perimeter of a sector includes *two* radii.	$4\pi + 9 + 9 = 30.6\,\text{cm}$
7	Line 1	The formula needs the radius, $12 \div 2 = 6\,\text{cm}$.	$\frac{4}{3} \times \pi \times 6^3 = 288\pi = 904.8\,\text{cm}^3$
8	Line 1	From A to B is back along $\mathbf{a}$ then along $\mathbf{b}$: $\overrightarrow{AB} = \mathbf{b} - \mathbf{a}$.	$\overrightarrow{OM} = \mathbf{a} + \frac{1}{2}(\mathbf{b} - \mathbf{a}) = \frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{b}$
9	Line 1	Divide 360 by the *exterior* angle: $180° - 156° = 24°$.	$360 \div 24 = 15$ sides
10	Line 3	The 5 cm and 12 cm lengths meet at a right angle, so use Pythagoras again rather than adding.	$\sqrt{5^2 + 12^2} = \sqrt{169} = 13\,\text{cm}$