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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 45

Plans and elevations

Higher tier

Answers and examiner comments

14	2009-2024	Higher
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

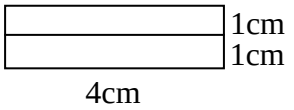
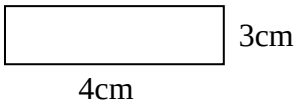
Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

9	(a)		8	1	B1 cao
	(b)		C	1	B1 for C or pyramid

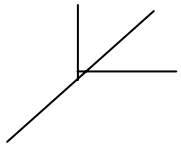
5	(a)		Correct plane	2	B2 for a correct plane defined by showing at least 2 adjacent lines of the plane (B1 for a line of symmetry on one face)
	(b)		Correct elevation 	2	B2 for a sketch of trapezium (B1 for trapezium with a rectangle or parallelogram added at top or a side or lines drawn from vertices)

1380 4H

1380/4H

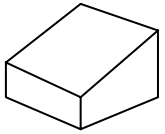
13 (a)		Plan shown as two rectangles 1cm by 4cm	2	B2 cao (B1 for a rectangle 4 cm x 1 cm or a rectangle 4 cm x 2 cm. Could be attached to other rectangles.) Do not accept rectangles with additional external lines.
(b)			2	B2 cao (B1 for a rectangle with one correct dimension) Do not accept rectangles with additional external lines. NB: any orientation possible; ignore internal lines.

1380_4H

Question	Working	Answer	Mark	Notes
14	(20×3 + 60×5 + 100×12 + 140×7 + 180×3) ÷ 30 = (60 + 300 + 1200 + 980 + 540) ÷ 30= = 3080 ÷ 30 Alternative: (20.5×3 + 60.5×5 + 100.5×12 + 140.5×7 180.5×3) ÷ 30 = 3080 ÷ 30	102.7 103.2	4	M1 for f×h for at least 3 consistent values of h in or at either end of intervals. M1 (dep) for use of all correct mid-interval values (accept 20-20.5 etc) M1 (dep on at least M1 scored) for $\sum fh \div 30$ A1 for 102.6 - 103.2
15 (a)		−3, −2, −1, 0, 1	2	B2 for all 5 correct values; ignore repeats, any order. (−1 for each omission or additional value)
(b)	$3x - x > 7 + 2$ $2x > 9$	$x > 4.5$	2	M1 for an attempt to move x to LHS or -2 to RHS eg $-x$ each side or $+2$ each side or sight of 2x or 9 or 2x>9 or sight of 2x on LHS of (in)equality or 9 on RHS of (in)equality. eg. 3x − x > 7 + 2 A1 oe Allow $x > 4\frac{1}{2}$, $x > \frac{9}{2}$ [SC: B1 for x = 4.5, x<4.5 if M0 scored]
16			2	B2 for correct locus within guidelines (overlay) (B1 for a line drawn parallel to either given line OR a line passing through the angle outside of the guidelines OR a line drawn within the guidelines but not passing through angle)

1380_4H

Question	Working	Answer	Mark	Notes
14 (a)			2	B2 for correct front elevation (B1 for the correct diagram with extra row or extra column) Internal lines need not be drawn
(b)			2	B2 for correct plan - it can be rotated (B1 for any rectangle that is not a square) Internal lines need not be drawn

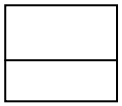
Question		Working	Answer	Mark	Notes
9	(a)		6 by 4 rectangle drawn	2	B2 for a 6 by 4 rectangle drawn (B1 for a rectangle drawn with one correct dimension)
	(b)		3-D sketch 	2	M1 for an attempt at a 3-D sketch with a trapezoidal face A1 for a correct 3-D sketch

5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10*		Angle *ABE* = 40 (vertically opposite angles are equal) Angle *BAE* = angle *BEA* = (180 – 40)/2 = 70 (base angles of an isos triangle are equal) *x* = 70 (alternate angles on parallel lines are equal) OR Angle *ABE* = 40 (vertically opposite angles are equal) Angle *BAE* = angle *BEA* = (180 – 40)/2 = 70 (base angles of an isosceles triangle are equal) Angle *BEF* = 40 (corresponding angles are equal) *x* = 180 – 70 – 40 = 70 (angles as a straight line add up to 180°)	70	5	B1 for angle *ABE* = 40, could be marked on the diagram M1 for (180 – '40')/2 (= 70) A1 for 70° identified as the angle x^o C2 for fully correct reasons: 'vertically opposite angles are equal' or 'vertically opposite angles are equal' 'base angles of an isosceles triangle are equal' 'alternate angles on parallel lines are equal' (C1 for just one correct reason quoted) OR B1 for angle *ABE* = 40 or angle *BEF* = 40, could be marked on the diagram M1 for (180 – '40')/2 (= 70) A1 for 70° identified as the angle x^o C2 for fully correct reasons: 'vertically opposite angles are equal' or 'vertically opposite angles are equal' 'base angles of an isosceles triangle are equal' 'corresponding angles on parallel lines are equal' 'angles on a straight line add up to 180' (C1 for just one correct reason quoted)

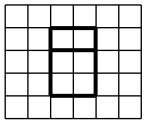
5MB2H_01

10			Correct elevation	2	M1 for a side elevation which shows 2 vertical, 2 horizontal and 1 sloping line in the correct order. A1 fully correct

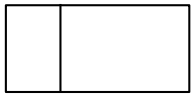
5MB2H_01

4			2	M1 for a 5cm by 5 cm square **or** a 5cm by 3 cm rectangle **or** a 5 cm by 2 cm rectangle A1 for correct elevation with dividing line NB: diagrams which appear to have a 3D element get 0 marks

PAPER: 1MA0_2H

5			2	B2 for correct side elevation (B1 for a rectangle with base 2 squares or height 3 squares)

PAPER: 1MA0/1H

4		Plan 	2	M1 for 7 × 4 rectangle A1 for correct plan with dividing line	G

5MB2H November 2016					
Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
*5	(180 – 120) ÷ 2 = 30 (180 – 30) ÷ 2	75°	4	M1 for method to find angle *ADB* (or angle *ABD*) (180 – 120) ÷ 2 A1 for 75 C1 (dep on M1) for Alternate angles are equal **or** co-interior (allied) angles add up to 180° C1 (dep on M1) for Base angles of an isosceles triangle are equal **and** Angles in a triangle add up to 180°	E

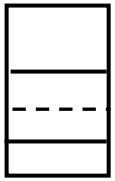
3		Side elevation	C2 [C1	for the side elevation (4 cm by 2 cm rectangle with a solid line drawn 1 cm from the 2 cm edge, and correct orientation) for the side elevation as a rectangle]
		Front elevation	C2 [C1	for the front elevation as a trapezium in correct orientation with base 4 cm, parallel sides 1 cm and 4 cm for the front elevation as a trapezium with two right angles] [Ignore incorrect or no labelling]

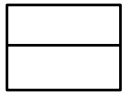
Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
5 (a)	isosceles triangle, base 6 cm, height 4 cm	M1	for drawing an isosceles triangle **or** for drawing a triangle of base 6cm and height 4cm	Accept a freehand drawing Only a single triangle is acceptable; do **not** accept any attempted nets or 3-D diagrams
		A1	for a fully correct diagram	Condone a perpendicular drawn from base to vertex
(b)	96 cm^2	M1	for a method to find the area of a triangular face eg ½ × 6 × 5 (= 15)	
		M1	(dep) for finding the total surface area eg 4 × "15" + 6 × 6	
		A1	for a numerical answer of 96	Ignore incorrect or absent units for this mark
			SC B1 for an answer of 84 if M0 scored	[The SC is from: 4 × ½ × 6 × 4 + 6 × 6]
		B1	cm^2	Ignore incorrect or absent numerical answer for this mark

Paper: 1MA1/1H

4	sketch	M1 A1	for sketch of a cylinder sketch of cylinder, with dimensions shown	Hidden edges may or may not be shown 2 (cm) for radius or 4 (cm) for diameter and 5 (cm) for height

2	Elevation	B2 (B1	fully correct side elevation 5 high and 3 wide for a rectangle 5 high and 3 wide or correct side elevation in the wrong orientation)	

Question	Answer	Mark	Mark scheme	Additional guidance
3 (a)	Explanation	C1	for explanation **Acceptable examples** The height of the rectangle / it should be less than 4 cm The 4 cm sides are wrong / too long The height of the rectangle should be 2.6... / $\sqrt{7}$ She's drawn the slanted height / not used the perpendicular height The height is smaller / not 4 cm / wrong It should be shorter as the side is at an angle It should be on an angle, so the height is smaller The length / width / side is 4 cm not the height She's drawn the face / the length and side / width of the rectangle She's drawn the length and side / width not the (length and the) height **Not acceptable examples** The rectangle should be wider The rectangle should be 6 squares high It doesn't tell us the height It should be smaller It's the front not the side It's not on a slant / it should be on a slant It goes up at an angle / it doesn't go straight up The length of the prism is 4 cm The length / width / side of the rectangle is 4 cm Side elevation is at a slant (not straight up)	
(b)		M1	for a 7 cm by 6 cm rectangle **or** for a 7 cm by n cm or m cm by 6 cm rectangle **and** dividing line which is parallel to the 7 cm or the m cm side	
		A1	for a fully correct plan	Accept any orientation Accept a freehand drawing

Paper: 1MA1/3H

Question 4

Having recognised that the solid shape is a cylinder the challenge for some students was to draw a sketch of a cylinder. Many students did draw an acceptable sketch and those who gave the correct dimensions of the solid on their sketch gained both marks. Some students did not include any dimensions on their sketch or made a mistake with one or both dimensions, giving the height as 4 cm instead of 5 cm for example, and gained one mark only. Labels such as “plan”, “front” and “side” were often seen on the sketches instead of the dimensions. A common mistake was to draw a shape that, at first glance, looked like a cylinder but with an extra face drawn perpendicular to the front face. These types of sketches gained 0 marks.

Question 2

The side elevation on this question was more challenging than many candidates have seen in some time, and very few were able to score full marks. This was normally down to the hidden edge not being indicated with a dashed line which was needed to make the diagram fully correct. That aside many struggled to identify the other edges on the front face and those who scored one it was typically for drawing a rectangle 5 high by 3 wide.

Question 3

Students gained the mark in part (a) for recognising that the height was incorrect, with some correctly stating that the height should be sqrt7 or 2.6. However, some seemed to think that the front elevation had been drawn as they were under the wrong impression that the arrow always points to the front and so the side elevation would be a triangle, whereas others believed that the elevation should be a trapezium. Some students' explanations were too ambiguous, for example stating 'it should be smaller' with no clear indication as to what 'it' referred to, did not gain the mark. Similar statements mentioning the slant were only given credit if it was clear that the slant was associated with height as otherwise it could have meant that the student thought that the rectangle should have been a parallelogram. Most students drew a rectangle in part (b) although sometimes this was drawn as part of a 3-D shape or as part of a net and in these cases no marks could be awarded. A frequent mistake was to draw one of the dimensions incorrectly, usually the 6 cm, which meant that a maximum of only one mark was awarded. Those students who drew a
correct 7 cm by 6 cm rectangle for the plan often forgot to draw in a solid line in the middle and so only gained the first mark. There were a significant number of students who appeared to be unsure of what was meant by a plan and drew a mixture of elevations labelled as front, top or birds eye view. Without the correct label a mixture of drawings was treated as choice and gained no marks. Students should be advised to draw just the one diagram if they are unsure as a mixture almost never scored a mark even if the correct diagram was seen
(as it often was).