

GCSE Mathematics (1MA1)

Themed papers – Angles: Proof

Compiled from student-friendly mark schemes

Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

NOTES ON MARKING PRINCIPLES

Guidance on the use of codes within this mark scheme

M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.

P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.

A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.

C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.

Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer).

Question 1 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$EBC = 35^\circ$ $FDE = 75^\circ$ corresponding angles are equal	1	This mark is given for finding one or two angles using parallel lines
	$FED = 70^\circ$ angles in a triangle sum to 180	1	This mark is given showing method to complete calculation to reach 70°
	$ABF = 70^\circ$ opposite angles in a parallelogram are equal	1	This mark is given for ABF identified as 70°
		1	This mark is given for full appropriate reasons given

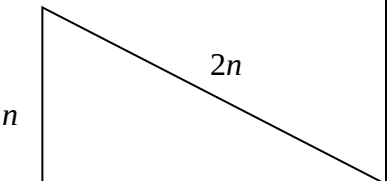
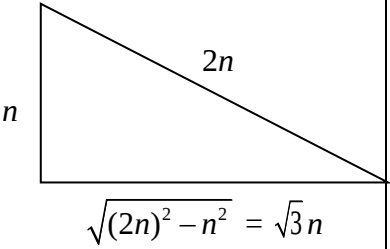
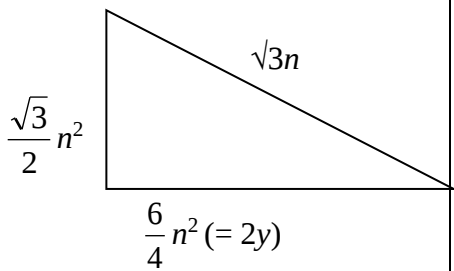
Question 2 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$ABC = BCD$	C1	This mark is given for comparing triangles ABC and BCD (given in the diagram)
	$AB = CD$	C1	This mark is given for stating that line $AB = CD$ (given in the diagram)
	$BC = BC$ (common)	C1	This mark is given for stating that line BC is common to both triangles ABC and BCD
	$ABC \equiv DCB$ [SAS] and thus $AC = BD$	C1	This mark is given for a conclusion to the proof showing that the two triangles have a common angle and two common sides; thus $AC = BD$

Question 3 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$AD = BC$ (opposite sides of a parallelogram are equal)	C1	This mark is given for identifying a pair of relevant equal sides or angles with reasons
	$\angle BAD = \angle BCD$ (opposite angles of a parallelogram are equal)	C1	This mark is given for a complete identification of all three aspects with reasons given
	$\angle ADP = \angle CBQ = 90^\circ$ (given on diagram)	C1	This mark is given for a correct conclusion of congruency (with reference to ASA)
(b)	Two pairs of angles and one pair of sides are equal (ASA), so ADP is congruent to CBQ	C1	This mark is given for a correct conclusion of congruency (with reference to ASA)
	$AP = QC$ since triangle ADP is congruent to triangle CBQ	C1	This mark is given for identifying a pair of equal sides in $APCQ$ with reasons
	$APCQ$ is a parallelogram and opposite sides of a parallelogram are equal	C1	This mark is given for a complete explanation

Question 4 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\sin 30^\circ = \frac{1}{2}, \cos 30^\circ = \frac{\sqrt{3}}{2}, \tan 30^\circ = \frac{1}{\sqrt{3}}$	B1	This mark is given for using any correct trigonometric value for 30°
		M1	This mark is given for finding the hypotenuse of the large triangle = $2n$
		A1	This mark is given for a method to find the hypotenuse of middle triangle
		A1	This mark is given for a correct equation linking y and n and correct working leading to the given result

Question 5 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$BEF = x$ (alternate angles are equal)	M1	This mark is given for the use of parallel lines to find an angle
	$EFB = \frac{180 - x}{2}$ (angles in a triangle add up to 180)	M1	This mark is given for finding an expression for the size of angle EFB
	$w + \frac{180 - x}{2} = 180$ (angles on a straight line add up to 180) $w = 180 - \frac{180 - x}{2} = 90 + \frac{1}{2}x$	M1	This mark is given for a complete method to show the printed result
	Alternate angles are equal Angles in a triangle add up to 180 Angles on a straight line add up to 180	C1	This mark is given for a complete list of reasons

Mark scheme for 1MA1 Higher themed papers: Angles: Proof

Performance data:

Q	Taken from			Total Marks available	TOPIC	Spec Ref	AO	% Mean marks	Edexcel mean averages Marks of candidates who achieved grade:										
	Q	Series	Paper						ALL	9	8	7	6	5	4	3	2	1	U
1	3	Nov 2017	1H	4	Geometry	G1, G3, G4	2	41	1.64	3.25	2.94	2.96	2.77	2.43	1.84	1.28			0.59
2	21	June 2017	1H	4	Geometry	G65	2	21	0.85	2.24	1.44	0.98	0.72	0.54	0.39	0.28	-	-	0.18
3a	21a	June 2018	3H	3	Geometry	G5	2	10	0.31	1.12	0.65	0.40	0.22	0.11	0.07	0.06	-	-	0.05
3b	21b	June 2018	3H	2	Geometry	G5	2	2	0.03	0.28	0.06	0.02	0.01	0.00	0.00	0.00	-	-	0.00
4	20	Mock Set 3	1H	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	9	Mock Set 3	2H	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				21					2.83	6.89	5.09	4.36	3.72	3.08	2.3	1.62	-	-	0.82