

Properties of shapes and congruence

Foundation and Higher tiers | Total marks: 53

Marks

- M** Method mark, for a correct method. It can be implied by a correct answer.
- A** Accuracy mark, for a correct answer. It needs the method mark before it.
- B** A mark for a correct value or statement, with or without working.
- ft** Follow through: the mark is given for using an earlier wrong answer correctly.
- oe** Or equivalent.
- [a, b]** Any value from a to b inclusive.

Questions

Q	Skill	Spec	Tier	Grade	Calculator	Marks
1	Naming quadrilaterals	G4	Foundation	1	No	2
2	Properties of quadrilaterals, a decision	G4	Foundation	2	No	1
3	Line and rotational symmetry	G1	Foundation	3	No	2
4	Properties of diagonals	G4	Foundation	3	No	1
5	Angles in a kite	G4 G3	Foundation	3	No	2
6	Parallelograms on a coordinate grid	G4 G11	Foundation	3	No	2
7	Isosceles triangles, a decision	G4 G3	Foundation	4	No	2
8	Angles in a trapezium, forming an equation	G4 G3 A17	Foundation	4	No	4
9	Diagonals of a rhombus	G4	Foundation	4	No	3
10	Conditions for congruent triangles	G5	Common	5	No	2
11	Angles of quadrilaterals, a counter example	G4	Foundation	5	No	2
12	Congruence proof	G5 G6	Common	6	No	3
13	Proof with congruent triangles	G6 G5	Common	7	No	4
14	Sides of a rhombus and a regular polygon	G4 G17	Foundation	2	Yes	3
15	Properties of a rectangle	G4 G16	Foundation	2	Yes	3
16	A square from its area	G4 G16	Foundation	3	Yes	3

Q	Skill	Spec	Tier	Grade	Calculator	Marks
17	Angle with a reason, and a side from the distance around	G4 G3	Foundation	3	Yes	4
18	Sides of a parallelogram	G4 A17	Foundation	4	Yes	3
19	Angles in a kite	G4 G3	Foundation	4	Yes	4
20	Testing for a right angle	G4 G20	Common	5	Yes	3
	Total					53

Question 1 G4 · Foundation · Grade 1 · 2 marks

Q	Answer	Mark	Comments
1(a)	kite	B1	
1(b)	trapezium	B1	

Question 2 G4 · Foundation · Grade 2 · 1 mark

Q	Answer	Mark	Comments
2	No and a rhombus has four equal sides (but its angles are not all 90°)	B1	oe, a sketch of a rhombus with no right angles

Question 3 G1 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
3(a)	column 4, row 2 shaded, counted from the bottom left	B1	the line of symmetry is the diagonal from bottom left to top right
3(b)	column 4, row 1 and column 4, row 3 shaded, counted from the bottom left	B1	no other squares shaded

Question 4 G4 · Foundation · Grade 3 · 1 mark

Q	Answer	Mark	Comments
4	rhombus	B1	

Question 5 G4 G3 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
5	$(360 - 124 - 58) \div 2$	M1	oe, $178 \div 2$
	89	A1	

Question 6 G4 G11 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
6(a)	(4, 0)	B1	
6(b)	(4, 2.5)	B1ft	ft the midpoint of B and their D

Question 7 G4 G3 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
7	considers 40° as one of the two equal angles	M1	for example $180 - 40 - 40$
	No and 40° and 100°	A1	oe

Question 8 G4 G3 A17 · Foundation · Grade 4 · 4 marks

Q	Answer	Mark	Comments
8(a)	$2x + x + 30 = 180$	M1	oe, co-interior angles
	$3x = 150$	M1	oe
	50	A1	
8(b)	No and angle DAB = 100° is not equal to angle ABC = 112°	B1ft	oe, ft their x

Question 9 G4 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
9	angle AMB = 90	M1	the diagonals of a rhombus cross at right angles, may be on the diagram
	$180 - 90 - 27$ or 63	M1	oe, or angle DAB = 54 (the diagonal bisects the angle)
	126	A1	accept $180 - 54$

Question 10 G5 · Common · Grade 5 · 2 marks

Q	Answer	Mark	Comments
10(a)	RHS	B1	
10(b)	No and the triangles could be different sizes	B1	oe, they are similar but not necessarily congruent

Question 11 G4 · Foundation · Grade 5 · 2 marks

Q	Answer	Mark	Comments
11	$360 \div 18 \times 2$ or 40 and 140	M1	oe, the four angles
	No and an isosceles trapezium (or a sketch) with angles $40^\circ, 40^\circ, 140^\circ, 140^\circ$	A1	oe, a correct counter example

Question 12 G5 G6 · Common · Grade 6 · 3 marks

Q	Answer	Mark	Comments
12	DA = AB	B1	sides of a square are equal
	angle DAP = angle ABQ = 90°	B1	angles of a square are right angles
	AP = BQ (given) and SAS	B1	a full proof with the condition stated

Question 13 G6 G5 · Common · Grade 7 · 4 marks

Q	Answer	Mark	Comments
13	BD = CE	M1	BD = BE – DE and CE = CD – DE
	angle ABD = angle ACE	M1	base angles of an isosceles triangle are equal
	triangles ABD and ACE are congruent (SAS)	M1	AB = AC, angle ABD = angle ACE, BD = CE
	AD = AE as they are corresponding sides of congruent triangles	A1	a full proof with reasons

Question 14 G4 G17 · Foundation · Grade 2 · 3 marks

Q	Answer	Mark	Comments
14	4×7.35 or 29.4	M1	the perimeter of the rhombus
	their $29.4 \div 5$	M1	oe
	5.88	A1	

Question 15 G4 G16 · Foundation · Grade 2 · 3 marks

Q	Answer	Mark	Comments
15(a)	11.9	B1	
15(b)	10.5×5.6	M1	
	58.8	A1	

Question 16 G4 G16 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
16	14.4×6.25 or 90	M1	
	$\sqrt{\text{their } 90}$	M1	oe, 9.48...
	9.5	A1	accept 9.5 or [9.48, 9.49]

Question 17 G4 G3 · Foundation · Grade 3 · 4 marks

Q	Answer	Mark	Comments
17(a)	62.6	B1	
	co-interior angles add up to 180°	B1	oe, such as allied angles, or angles next to each other in a parallelogram add up to 180° . Accept angles in a quadrilateral add up to 360° with opposite angles equal
17(b)	$(29.5 - 2 \times 8.65) \div 2$ or $12.2 \div 2$	M1	oe, or $29.5 \div 2 - 8.65$
	6.1	A1	

Question 18 G4 A17 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
18	$47.2 \div 2$ or 23.6	M1	oe, or $2x + 2(x + 3.4) = 47.2$
	$(23.6 - 3.4) \div 2$ or 10.1	M1	oe, BC
	13.5	A1	

Question 19 G4 G3 · Foundation · Grade 4 · 4 marks

Q	Answer	Mark	Comments
19	angle ADC = 112.45	M1	may be on the diagram
	$360 - 2 \times 112.45$ or 135.1	M1	the sum of angles BAD and BCD
	their $135.1 \div 3.5$ or 38.6	M1	oe, angle BCD, or $2.5x + x = 135.1$
	96.5	A1	

Question 20 G4 G20 · Common · Grade 5 · 3 marks

Q	Answer	Mark	Comments
20	$8.4^2 + 11.2^2$ or 196	M1	oe, or $14.1^2 = 198.81$
	$\sqrt{196}$ or 14	M1	oe, or 198.81 compared with 196
	No and 14 is not 14.1	A1	oe, a correct conclusion from correct values