4.5 Properties of 2D Shapes: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A quadrilateral has no parallel sides, two pairs of adjacent equal sides and 1 line of symmetry.
Write down the mathematical name of the quadrilateral.

(1)

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2 Three angles of a quadrilateral are 80°, 104° and 50°. Work out the fourth angle and say whether the quadrilateral could be a parallelogram.

(3)

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3 What is the name of a polygon with 6 sides?

(1)

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4 Three angles of a quadrilateral are 73°, 104° and 94°. Work out the fourth angle and say whether the quadrilateral could be a parallelogram.

(3)

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5 A triangle has angles 27° and 63°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

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6 What is the name of a polygon with 12 sides?

(1)

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7 A polygon has 6 sides. How many diagonals can be drawn from one vertex?

(2)

---

8 Three angles of a quadrilateral are 111°, 109° and 66°. Work out the fourth angle and say whether the quadrilateral could be a parallelogram.

(3)

---

9 What is the name of a polygon with 9 sides?

(1)

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10 A triangle has angles 79° and 68°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

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11 A quadrilateral has opposite sides equal and no lines of symmetry.
Write down the mathematical name of the quadrilateral.

(1)

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12 A triangle has angles 47° and 34°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

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13 A triangle has angles 32° and 81°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

---

14 A quadrilateral has 1 pair of parallel sides and one pair of equal sides (the non-parallel pair).
Write down the mathematical name of the quadrilateral.

(1)

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15 A triangle has angles 38° and 88°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

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16 Three angles of a quadrilateral are 130°, 102° and 49°. Work out the fourth angle.

(2)

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17 A quadrilateral has two pairs of adjacent equal sides, diagonals that cross at right angles and 1 line of symmetry.
Write down the mathematical name of the quadrilateral.

(1)

---

18 Three angles of a quadrilateral are 79°, 57° and 65°. Work out the fourth angle and say whether the quadrilateral could be a parallelogram.

(3)

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19 A triangle has angles 41° and 28°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

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20 How many sides does a pentagon have?

(1)

---

21 A quadrilateral has 1 pair of parallel sides, diagonals that do not cross at right angles and 1 line of symmetry.
Write down the mathematical name of the quadrilateral.

(1)

---

22 How many sides does a heptagon have?

(1)

---

23 A regular polygon has 9 lines of symmetry. How many sides has it, and what is the size of each exterior angle?

(2)

---

24 Three angles of a quadrilateral are 77°, 114° and 86°. Work out the fourth angle and say whether the quadrilateral could be a parallelogram.

(3)

---

25 A polygon has 8 sides. How many diagonals can be drawn from one vertex?

(2)

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26 Write down (a) the number of lines of symmetry and (b) the order of rotational symmetry of a square.

(2)

---

27 Three angles of a quadrilateral are 89°, 113° and 86°. Work out the fourth angle and say whether the quadrilateral could be a parallelogram.

(3)

---

28 Three angles of a quadrilateral are 90°, 76° and 96°. Work out the fourth angle.

(2)

---

29 A regular polygon has 4 lines of symmetry. How many sides has it, and what is the size of each exterior angle?

(2)

---

30 Three angles of a quadrilateral are 55°, 88° and 77°. Work out the fourth angle.

(2)

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31 A triangle has angles 23° and 69°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

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32 A quadrilateral has 1 pair of parallel sides and no lines of symmetry.
Write down the mathematical name of the quadrilateral.

(1)

---

33 Three angles of a quadrilateral are 65°, 109° and 57°. Work out the fourth angle.

(2)

---

34 A triangle has angles 90° and 49°. Work out the third angle and describe the triangle using the words equilateral, isosceles or scalene, and acute-angled, right-angled or obtuse-angled.

(3)

---

35 A quadrilateral has diagonals that cross at right angles and rotational symmetry of order 2.
Write down the mathematical name of the quadrilateral.

(1)

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36 A regular polygon has 7 lines of symmetry. How many sides has it, and what is the size of each exterior angle?

(2)

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37 The angles in a quadrilateral are 90 degrees, 80 degrees and 110 degrees. Work out the fourth angle.

(2)

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38 A parallelogram has one angle equal to 112 degrees. Work out the size of the angle adjacent to it.

(2)

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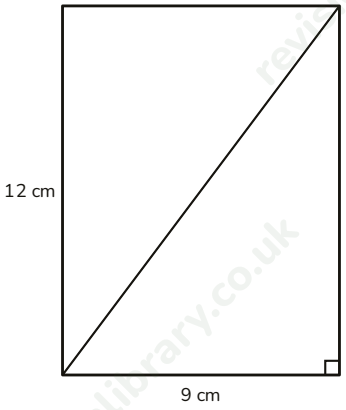
39 A regular octagon has 8 equal sides and 8 equal interior angles. Work out the size of each interior angle.

(2)

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40 A rectangle has sides 9 cm and 12 cm. Calculate the length of a diagonal of the rectangle.

Diagram NOT accurately drawn



(3)

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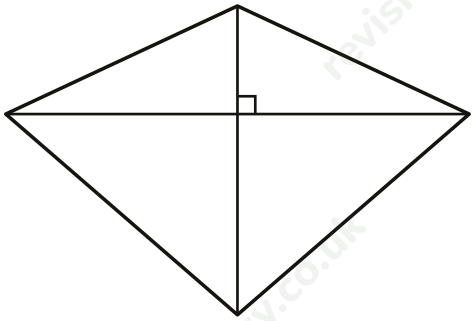
41 A regular hexagon has interior angle x. Work out x, and state how many lines of symmetry a regular hexagon has.

(3)

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42 A kite has one diagonal of length 18 cm. Its area is 108 cm². Work out the length of the other diagonal.

Diagram NOT accurately drawn



Horizontal diagonal = 18 cm

Area = 108 cm²

(3)

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43 State how many lines of symmetry a regular pentagon has.

(1)

---

44 A triangle has sides of length 9 cm, 9 cm and 9 cm. State whether it is scalene, isosceles or equilateral.

(1)

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45 A quadrilateral has one pair of parallel sides and the other pair not parallel. Name this quadrilateral.

(1)

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Mark scheme · 4.5 Properties of 2D Shapes: 2-hour Pack

Question 1

kite cao — B1

Answer: **kite**

Question 2

360 - 234 — M1

126° — A1

parallelogram needs opposite angles equal; check pairs — B1

Answer: **126°; it cannot be a parallelogram**

Question 3

hexagon cao — B1

Answer: **hexagon**

Question 4

360 - 271 — M1

89° — A1

parallelogram needs opposite angles equal; check pairs — B1

Answer: **89°; it cannot be a parallelogram**

Question 5

180 - 27 - 63 — M1

90° — A1

scalene and right-angled — B1

Answer: **90°; scalene, right-angled**

Question 6

dodecagon cao — B1

Answer: **dodecagon**

Question 7

6 - 3 or counts all other vertices excluding the two neighbours — M1

3 cao — A1

Answer: **3**

Question 8

360 - 286 — M1

74° — A1

parallelogram needs opposite angles equal; check pairs — B1

Answer: **74°; it cannot be a parallelogram**

Question 9

nonagon cao — B1

Answer: **nonagon**

Question 10

180 - 79 - 68 — M1

33° — A1

scalene and acute-angled — B1

Answer: **33°; scalene, acute-angled**

Question 11

parallelogram cao — B1

Answer: **parallelogram**

Question 12

180 - 47 - 34 — M1

99° — A1

scalene and obtuse-angled — B1

Answer: **99°; scalene, obtuse-angled**

Question 13

180 - 32 - 81 — M1

67° — A1

scalene and acute-angled — B1

Answer: **67°; scalene, acute-angled**

Question 14

isosceles trapezium cao — B1

Answer: **isosceles trapezium**

Question 15

180 - 38 - 88 — M1

54° — A1

scalene and acute-angled — B1

Answer: **54°; scalene, acute-angled**

Question 16

360 - 130 - 102 - 49 or 360 - 281 — M1

79° cao — A1

Answer: **79°**

Question 17

kite cao — B1

Answer: **kite**

Question 18

360 - 201 — M1

159° — A1

parallelogram needs opposite angles equal; check pairs — B1

Answer: **159°; it cannot be a parallelogram**

Question 19

180 - 41 - 28 — M1

111° — A1

scalene and obtuse-angled — B1

Answer: **111°; scalene, obtuse-angled**

Question 20

5 cao — B1

Answer: **5**

Question 21

isosceles trapezium cao — B1

Answer: **isosceles trapezium**

Question 22

7 cao — B1

Answer: **7**

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Question 23

9 sides **B1**

40° **B1**

Answer: **9 sides, 40°**

Question 24

360 - 277 **M1**

83° **A1**

parallelogram needs opposite angles equal; check pairs **B1**

Answer: **83°; it cannot be a parallelogram**

Question 25

8 - 3 or counts all other vertices excluding the two neighbours **M1**

5 cao **A1**

Answer: **5**

Question 26

(a) 4 **B1**

(b) 4 **B1**

Answer: **(a) 4, (b) 4**

Question 27

360 - 288 **M1**

72° **A1**

parallelogram needs opposite angles equal; check pairs **B1**

Answer: **72°; it cannot be a parallelogram**

Question 28

360 - 90 - 76 - 96 or 360 - 262 **M1**

98° cao **A1**

Answer: **98°**

Question 29

4 sides **B1**

90° **B1**

Answer: **4 sides, 90°**

Question 30

360 - 55 - 88 - 77 or 360 - 220 **M1**

140° cao **A1**

Answer: **140°**

Question 31

180 - 23 - 69 **M1**

88° **A1**

scalene and acute-angled **B1**

Answer: **88°; scalene, acute-angled**

Question 32

trapezium cao **B1**

Answer: **trapezium**

Question 33

360 - 65 - 109 - 57 or 360 - 231 **M1**

129° cao **A1**

Answer: **129°**

Question 34

180 - 90 - 49 **M1**

41° **A1**

scalene and right-angled **B1**

Answer: **41°; scalene, right-angled**

Question 35

rhombus cao **B1**

Answer: **rhombus**

Question 36

7 sides **B1**

360/7° **B1**

Answer: **7 sides, 360/7°**

Question 37

uses sum of angles in quadrilateral = 360 and computes 90 + 80 + 110 = 280 oe **M1**

80 degrees cao **A1**

Answer: **80 degrees**

Question 38

uses adjacent angles in a parallelogram sum to 180 oe **M1**

68 degrees cao **A1**

Answer: **68 degrees**

Question 39

uses interior angle = (n-2) x 180 / n with n = 8 **M1**

135 degrees cao **A1**

Answer: **135 degrees**

Question 40

uses Pythagoras' theorem: diagonal^2 = 9^2 + 12^2 **M1**

9^2 + 12^2 = 81 + 144 = 225 **M1**

diagonal = 15 cm cao **A1**

Answer: **15 cm**

Question 41

uses interior angle = (n-2) x 180 / n with n = 6 **M1**

x = 120 degrees cao **A1**

6 lines of symmetry **B1**

Answer: **x = 120 degrees; 6 lines of symmetry**

Question 42

uses area = (d1 x d2) / 2 rearranged **M1**

18 x d2 = 216 **M1**

d2 = 12 cm cao **A1**

Answer: **12 cm**

Question 43

5 cao **B1**

Answer: **5**

Question 44

equilateral cao **B1**

Answer: **Equilateral**

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Question 45

trapezium **B1**

Answer: **Trapezium**

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