KS2.M-Y6G1 Geometry: Properties of Shapes and Angles

Total Marks

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Name the shape that has exactly four equal sides and four right angles.

(1)

2 One angle in a triangle is 90 degrees and the other two angles are equal. Work out the size of each of the equal angles.

(2)

3 A regular hexagon has interior angles that are all the same. Calculate the size of one interior angle of a regular hexagon.

(2)

4 The angles in a quadrilateral are in the ratio 2:3:4:5. Work out the size of the smallest angle.

(2)

5 A circle is split into three parts. Two central angles are 110 degrees and 85 degrees. What is the size of the third central angle?

(2)

6 A right-angled triangle has sides of lengths 6 cm and 8 cm that meet at the right angle. Work out the length of the hypotenuse. Give your answer to 1 decimal place.

(2)

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7 Draw a shape with exactly one pair of parallel sides and no right angles. Give the name of the shape.

(2)

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8 A kite has two equal adjacent sides and one diagonal that bisects the other at right angles. If one angle between the unequal sides is 70 degrees, what is the opposite angle between the unequal sides?

(2)

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9 In the diagram a straight line meets two parallel lines. One acute angle is 62 degrees. Work out the corresponding angle on the other parallel line.

(2)

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10 A quadrilateral has three angles measuring 95 degrees, 80 degrees and 65 degrees. Find the size of the fourth angle.

(2)

11 Explain why the angles on a straight line add up to 180 degrees. Give a short reason.

(2)

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12 A regular pentagon has side length 6 cm. Calculate the sum of its interior angles, then give the size of one interior angle.

(2)

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13 A student draws a quadrilateral with three right angles. Explain whether the fourth angle must be a right angle. Give a short reason.

(2)

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14 In a circle, an arc has a central angle of 140 degrees. What is the size of the reflex angle outside that arc (the larger angle around the circle)?

(2)

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15 Triangle ABC is isosceles with AB = AC. The angle at A is 40 degrees. Find the size of each base angle at B and C.

(2)

16 A rectangle has been split into two triangles by a diagonal. One triangle has angles 90 degrees and 30 degrees. Find the three angles of the other triangle formed by the same diagonal.

(2)

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17 A student says that a regular polygon with each interior angle 150 degrees must be a regular dodecagon. Is the student correct? Explain your answer and show how you decide which regular polygon it is.

(2)

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18 A quadrilateral has sides of equal length and opposite angles equal. Is this enough to say it is a parallelogram, a rhombus, or both? Give the correct name and a short explanation.

(3)

Mark scheme · KS2.M-Y6G1 Geometry: Properties of Shapes and Angles

Question 1

- **B1** square cao
- Answer: **square**

Question 2

- **M1** Subtract 90 from 180 to get 90 or equivalent working
- **B1** Each equal angle 45 degrees cao
- Answer: **45 degrees**

Question 3

- **M1** Use (n-2)x180 = 4x180 = 720 or show sum of interior angles
- **B1** 720/6 = 120 degrees cao
- Answer: **120 degrees**

Question 4

- **M1** Sum ratios = 14 and show 360 divided by 14 or equivalent working
- **B1** Smallest angle = 2 x (360/14) = 51 3/7 degrees or 51.428... degrees cao
- Answer: **51.4285714286 degrees**

Question 5

- **M1** Add 110 and 85 to get 195 or equivalent
- **B1** 360 - 195 = 165 degrees cao
- Answer: **165 degrees**

Question 6

- **M1** Use Pythagoras: $6^2 + 8^2 = 36 + 64 = 100$ seen
- **B1** Hypotenuse = 10.0 cm cao
- Answer: **10.0 cm**

Question 7

- **M1** A correct trapezium drawn (one pair of parallel sides, no right angles) or equivalent
- **B1** Name given as trapezium cao
- Answer: **trapezium**

Question 8

- **M1** Reference to kite symmetry or properties showing opposite angle between unequal sides is equal
- **B1** Answer 70 degrees cao
- Answer: **70 degrees**

Question 9

- **M1** Identify corresponding angles are equal
- **B1** Answer 62 degrees cao
- Answer: **62 degrees**

Question 10

- **M1** Add 95+80+65 = 240 seen
- **B1** 360 - 240 = 120 degrees cao
- Answer: **120 degrees**

Question 11

- **M1** Reference to straight line as half turn or sum of two right angles
- **B1** Conclusion that sum is 180 degrees cao
- Answer: **A straight line is a half turn (180 degrees), so angles on it add to 180 degrees**

Question 12

- **M1** Use (n-2)x180 = 3x180 = 540 or show sum of interior angles
- **B1** One interior angle = 540/5 = 108 degrees cao
- Answer: **108 degrees**

Question 13

- **M1** State that angles in quadrilateral sum to 360 degrees or show 90+90+90 = 270
- **B1** Fourth angle = 360 - 270 = 90 degrees, so it must be a right angle cao
- Answer: **Yes. The angles sum to 360 so fourth angle = 360 - 270 = 90 degrees**

Question 14

- **M1** Recognise reflex angle = 360 - central angle or show 360 - 140
- **B1** Reflex angle = 220 degrees cao
- Answer: **220 degrees**

Question 15

- **M1** Use sum of angles in triangle: 180 - 40 = 140 seen
- **B1** Base angles each 70 degrees cao
- Answer: **70 degrees**

Question 16

- **M1** Recognise triangles share the diagonal and angles at rectangle corners are right angles
- **B1** Other triangle angles are 90 degrees, 60 degrees and 30 degrees cao
- Answer: **90 degrees, 60 degrees, 30 degrees**

Question 17

- **M1** Show relationship interior angle = 180 - (360/n) or compute exterior angle 30 degrees
- **B1** n = 360/30 = 12; student is correct that it is a dodecagon cao
- Answer: **Yes. Exterior angle = 180 - 150 = 30, so n = 360/30 = 12**

Question 18

- **M1** State that equal side lengths and opposite equal angles imply opposite sides are parallel or argue properties
- **B1** Name given as rhombus cao
- **B1** Brief reason: all sides equal and opposite angles equal meet rhombus properties (also is a parallelogram) cao
- Answer: **A rhombus. Four equal sides and opposite equal angles fit a rhombus; it is also a parallelogram.**