

GCSE MATHS

Angles, shapes and circles

Worked Solutions

Q1

★

2

One line through each pair of opposite side midpoints.

Q2

★

$$360/120 = 3$$

Three rotations within a full turn match the triangle.

Q3

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Rhombus

Four equal sides do not require right angles.

Q4

★★

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Each vertex gives one symmetry line through the opposite side midpoint.

Q5

★★

$$360^\circ/8 = 45^\circ$$

Divide one turn into eight equal rotations.

Q6

★★

Trapezium

A trapezium has one pair of parallel sides.

Q7

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$$x = 180^\circ - 127^\circ = 53^\circ$$

Angles on a straight line sum to 180° .

Q8

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$$x = 360^\circ - 85^\circ - 140^\circ = 135^\circ$$

Subtract the two known angles from a full turn.

Q9

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68°

Vertically opposite angles are equal.

Q10

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$x = 65^\circ$

Corresponding angles are equal on parallel lines.

Q11

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$x = 180^\circ - 112^\circ = 68^\circ$

These interior angles sum to 180° .**Q12**

$3x + 10 + 2x - 5 = 180$

Add the two angles.

$5x + 5 = 180 \Rightarrow x = 35$

Collect terms and solve.

Q13

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$180^\circ - 47^\circ - 68^\circ = 65^\circ$

Use the triangle angle sum.

Q14

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$(180^\circ - 38^\circ)/2 = 71^\circ$

The two base angles are equal.

Q15

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$(7 - 2)180^\circ = 900^\circ$

Split the polygon into five triangles.

Q16

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$n = 360/24 = 15$

Equal exterior angles add to 360° .

Q17

$$e = 180^\circ - 156^\circ = 24^\circ$$

Find one exterior angle.

$$n = 360/24 = 15$$

Divide the full exterior turn.

Q18

$$5x + 100 = (5 - 2)180 = 540$$

Use the pentagon angle sum.

$$x = 88$$

Solve for the smallest angle.

$$x + 40 = 128^\circ$$

Find the largest angle.

Q19

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(a) AB*AB* passes through the centre and has both endpoints on the circle.**(b)** OC*OC* joins the centre to a point on the circle.**(c)** DE*DE* joins two points on the circle without passing through the centre.**(d)** TangentThe line touches the circle at *C* without crossing it.**Q20**

$$2 + 3 + 4 = 9$$

Count the ratio parts.

$$180^\circ / 9 = 20^\circ$$

Find one part.

$$4(20^\circ) = 80^\circ$$

Take four parts.

Q21

$$\angle BAC = x$$

Use the equal base angles.

$$\angle ABC = (180 - x)/2$$

$$180 - (180 - x)/2 = 3x$$

The exterior angle is supplementary to angle *ABC*.

$$180 + x = 6x \Rightarrow x = 36^\circ$$

Solve the equation.