# OCR 08 Basic Geometry (Higher)

1. A quadrilateral has two pairs of parallel opposite sides. Its diagonals intersect at 90°.

Write the name of this shape.

1. Which of these shapes are regular polygons?

60°

**A**

**Not to scale**

**C**

**B**

60°

60°

1. Find the size of angle *a*.

*a*

**Not to scale**

1. Calculate the exterior angle of a regular octagon.
2. Quadrilateral KLMN is inscribed in a circle.

Calculate the size of angle *x*.

L

92°

64°

K

**Not to scale**

*x*

N

M

1. This 3D shape is an L-shaped prism.

Write down the number of edges, faces and vertices the shape has.

1. Which of these shapes have exactly two lines of symmetry **and** rotational symmetry of order 2?

**D**

**E**

**A**

**G**

**C**

**B**

**H**

**F**

**I**

1. This shape is made from 7 cubes.

Draw its plan view.

1. This is a regular 20-sided polygon.

Calculate the size of angle *a*.



*a*

1. XY is a tangent to the circle at point P.

Calculate the angle QPY.

R

Q

Y

P

X

75°

50°

**Not to scale**

1. Draw a labelled diagram where
* point B is 4 cm from point A,
* C is equidistant from point A and point B,
* C is on a bearing of 215° from point B.
1. AB and BC are tangents to a circle with centre O. They meet the circle at P and Q respectively. POQ is a right angle. Prove that POQB is a square.

C

A

O

**Not to scale**

Q

P

B

1. P, Q, R and S are points on the circumference of a circle. PR meets QS at A.

Prove that angle QPR is equal to 47°.

P

77°

Q

R

**Not to scale**

56°

A

S

1. This shape is a regular tetrahedron. It is has four identical triangular faces.

Kit says “A regular tetrahedron is also a pyramid”.

Is Kit correct? Give a reason for your decision.



1. This is the plan of three different **cubes** on a flat surface.

Draw a side view looking along the arrow from X.



1. In triangle ABC, AB  AC.

Find an expression for *x* in terms of *b*.

A

*b*

**Not to scale**

D

*x*

C

B

1. The diagram shows a cross inscribed in a regular 10-sided polygon.

Find the size of angle *k*.



*k*

1. Three villages Princetown, Queensbury and Kingsham are joined by straight roads. Queensbury is 5 miles from Princetown on a bearing of 010°. Kingsham is 5 miles from Princetown on a bearing of 090°. Construct an accurate diagram to show the locus of points that are
* nearer to the road between Princetown and Queensbury than to the road between Princetown and Kingsham,
* less than four miles from Princetown.

Use a scale of 1 cm : 1 mile.

1. AB, CD and PQ are straight lines.

What value of *x* makes AB and CD parallel?

A

B

C

D

P

Q

(4*x* − 3)°

(3*x* + 8)°

(5*x* − 42)°

1. A square is drawn on a coordinate grid.

After the square is translated through , its vertices are the points

(5, 1), (1, 5), (-3, 1) and (1, -3).

Find the coordinates of the **centre** of the original square.

### Answers

1. Rhombus or square
2. B, C
3. 45°
4. 45°
5. 116°
6. 18 edges, 8 faces, 12 vertices
7. A, B, C, F
8. 20-sided polygon so angles at centre are 18°.

 (isosceles triangle)

1. PRQ  55° (angles in triangle sum to 180°)

QPY  55° (alternate segment theorem)

215°

4 cm

N

B

A

C

1.  (radius meeting tangent) so POQB has 4 right angles.

 so POQB is a square.

1.  (opposite angles)

so  (angles in a triangle sum to 180°)

  (angles in the same segment).

1. Yes, it is a triangle-based pyramid with triangular faces meeting at the apex.



1.  (angles on a straight line sum to 180°)

 (angles in a triangle (BDC) sum to 180°)

 (alternate angles)

 (angles in a triangle (DAB) sum to 180°)

 (isosceles triangle)





*k*

*k°*

*k* is half the interior angle of the polygon (144°) so  (see diagram).

Alternatively, work out angles in pentagon that contains *k*: 

 

N

10°

P

K

Q

4 cm

1 cm

1.  (corresponding angles are equal when AB and CD are parallel)

so.

1. Centre of square is (1, 1) so original square had centre (3, -2).

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Know basic properties of quadrilaterals |  |  |  |  | AO1 | 1 | Know basic properties of quadrilaterals |  |  |  |
| AO1 | 2 | Know properties of regular polygons |  |  |  |  | AO1 | 2 | Know properties of regular polygons |  |  |  |
| AO1 | 3 | Apply angles subtended at centre and circumference |  |  |  |  | AO1 | 3 | Apply angles subtended at centre and circumference |  |  |  |
| AO1 | 4 | Use the sum of exterior angles of a polygon |  |  |  |  | AO1 | 4 | Use the sum of exterior angles of a polygon |  |  |  |
| AO1 | 5 | Apply opposite angles of a cyclic quadrilateral are supplementary |  |  |  |  | AO1 | 5 | Apply opposite angles of a cyclic quadrilateral are supplementary |  |  |  |
| AO1 | 6 | Recognise terms relating to polyhedra |  |  |  |  | AO1 | 6 | Recognise terms relating to polyhedra |  |  |  |
| AO1 | 7 | Identify reflection and rotation symmetries |  |  |  |  | AO1 | 7 | Identify reflection and rotation symmetries |  |  |  |
| AO1 | 8 | Construct plans of 3D solids from elevations |  |  |  |  | AO1 | 8 | Construct plans of 3D solids from elevations |  |  |  |
| AO1 | 9 | Apply angle facts to find angles in rectilinear figures |  |  |  |  | AO1 | 9 | Apply angle facts to find angles in rectilinear figures |  |  |  |
| AO1 | 10 | Apply alternate segment theorem |  |  |  |  | AO1 | 10 | Apply alternate segment theorem |  |  |  |
| AO2 | 11 | Draw diagrams from written descriptions |  |  |  |  | AO2 | 11 | Draw diagrams from written descriptions |  |  |  |
| AO2 | 12 | Apply angle between radius and tangent |  |  |  |  | AO2 | 12 | Apply angle between radius and tangent |  |  |  |
| AO2 | 13 | Apply angles in the same segment |  |  |  |  | AO2 | 13 | Apply angles in the same segment |  |  |  |
| AO2 | 14 | Know properties of 3D solids |  |  |  |  | AO2 | 14 | Know properties of 3D solids |  |  |  |
| AO2 | 15 | Construct elevations of 3D solids from plans |  |  |  |  | AO2 | 15 | Construct elevations of 3D solids from plans |  |  |  |
| AO3 | 16 | Apply angle properties in formal proofs |  |  |  |  | AO3 | 16 | Apply angle properties in formal proofs |  |  |  |
| AO3 | 17 | Apply angle facts to find angles in rectilinear figures |  |  |  |  | AO3 | 17 | Apply angle facts to find angles in rectilinear figures |  |  |  |
| AO3 | 18 | Apply ruler and compass constructions to identify loci |  |  |  |  | AO3 | 18 | Apply ruler and compass constructions to identify loci |  |  |  |
| AO3 | 19 | Apply angle properties in more formal proofs |  |  |  |  | AO3 | 19 | Apply angle properties in more formal proofs |  |  |  |
| AO3 | 20 | Use *x*, *y* coordinates in plane geometry problems |  |  |  |  | AO3 | 20 | Use *x*, *y* coordinates in plane geometry problems |  |  |  |