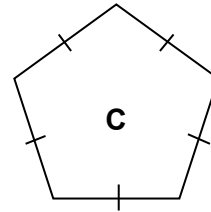
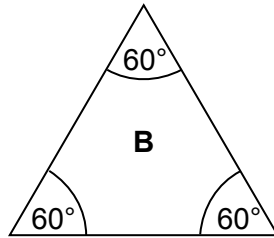
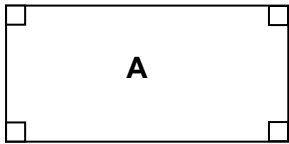


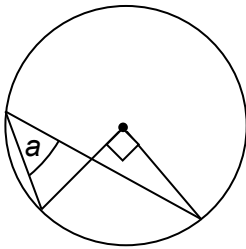
OCR 08 Basic Geometry (Higher)

1. A quadrilateral has two pairs of parallel opposite sides. Its diagonals intersect at 90° . Write the name of this shape.
2. Which of these shapes are regular polygons?



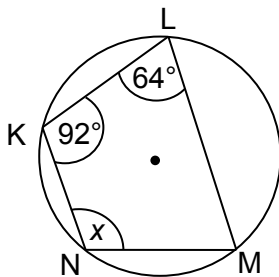
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3. Find the size of angle a .



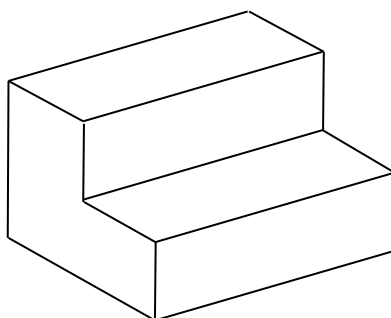
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4. Calculate the exterior angle of a regular octagon.
5. Quadrilateral KLMN is inscribed in a circle. Calculate the size of angle x .

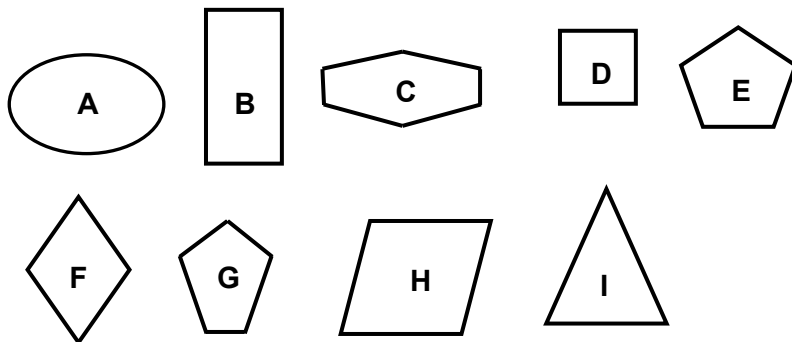


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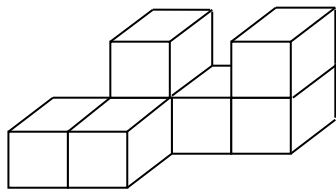
6. This 3D shape is an L-shaped prism. Write down the number of edges, faces and vertices the shape has.



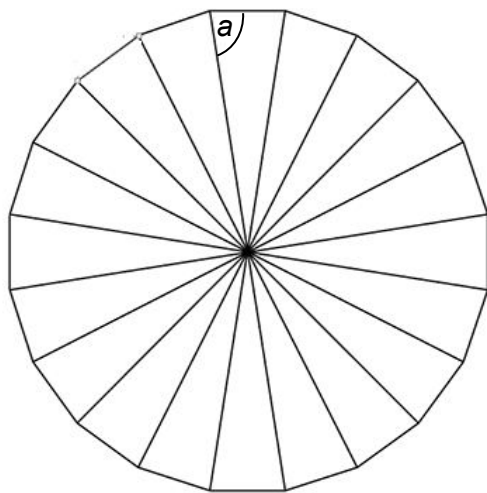
7. Which of these shapes have exactly two lines of symmetry **and** rotational symmetry of order 2?



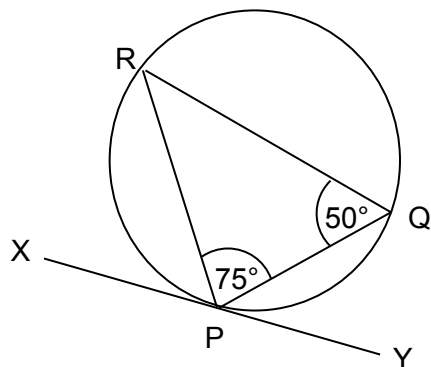
8. This shape is made from 7 cubes.
Draw its plan view.



9. This is a regular 20-sided polygon.
Calculate the size of angle a .



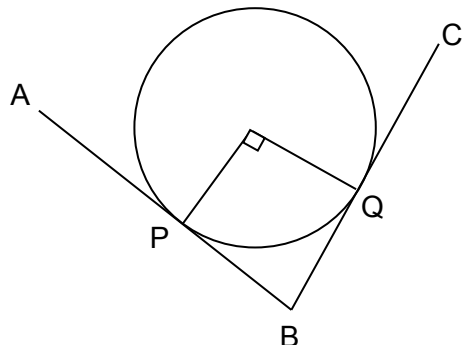
10. XY is a tangent to the circle at point P.
Calculate the angle QPY.



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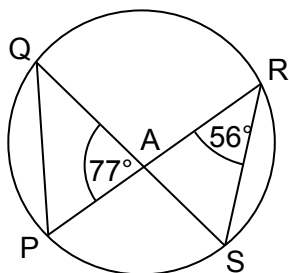
11. Draw a labelled diagram where
- point B is 4 cm from point A,
 - C is equidistant from point A and point B,
 - C is on a bearing of 215° from point B.

12. 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.



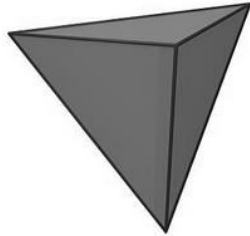
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13. P, Q, R and S are points on the circumference of a circle. PR meets QS at A.
Prove that angle QPR is equal to 47° .

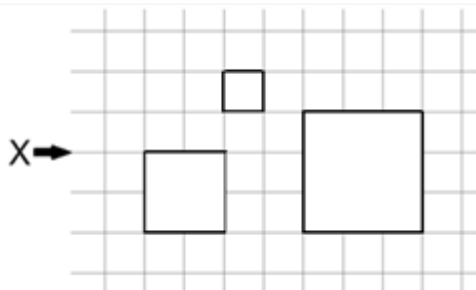


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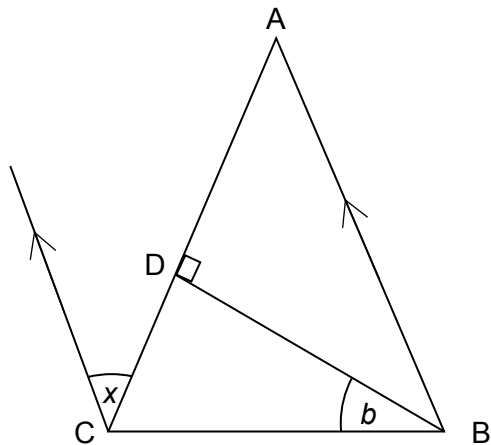
14. This shape is a regular tetrahedron. It has four identical triangular faces.
Kit says "A regular tetrahedron is also a pyramid".
Is Kit correct? Give a reason for your decision.



15. This is the plan of three different **cubes** on a flat surface.
Draw a side view looking along the arrow from X.

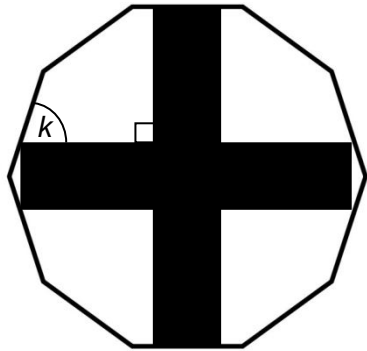


16. In triangle ABC, $AB = AC$.
Find an expression for x in terms of b .



Not to scale

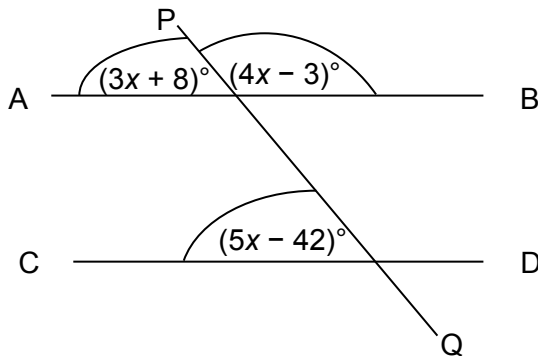
17. The diagram shows a cross inscribed in a regular 10-sided polygon. Find the size of angle k .



18. 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.

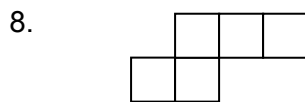
19. AB, CD and PQ are straight lines. What value of x makes AB and CD parallel?



20. A square is drawn on a coordinate grid. After the square is translated through $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$, 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

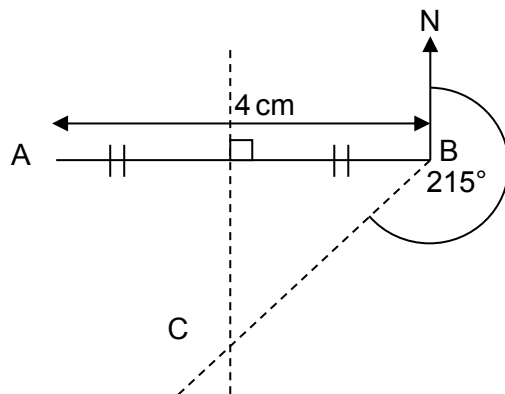


9. 20-sided polygon so angles at centre are 18° .

$$a = \frac{180 - 18}{2} = 81^\circ \text{ (isosceles triangle)}$$

10. $\angle PRQ = 55^\circ$ (angles in triangle sum to 180°)
 $\angle QPY = 55^\circ$ (alternate segment theorem)

- 11.

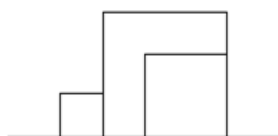


12. $\angle OPB = \angle OQB$ (radius meeting tangent) so POQB has 4 right angles.
 $OP = OQ$ so POQB is a square.

13. $\angle RAS = 77^\circ$ (opposite angles)
 so $\angle RSA = 47^\circ$ (angles in a triangle sum to 180°)
 $= \angle QPR$ (angles in the same segment).

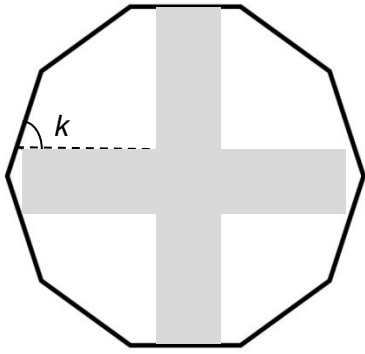
14. Yes, it is a triangle-based pyramid with triangular faces meeting at the apex.

- 15.



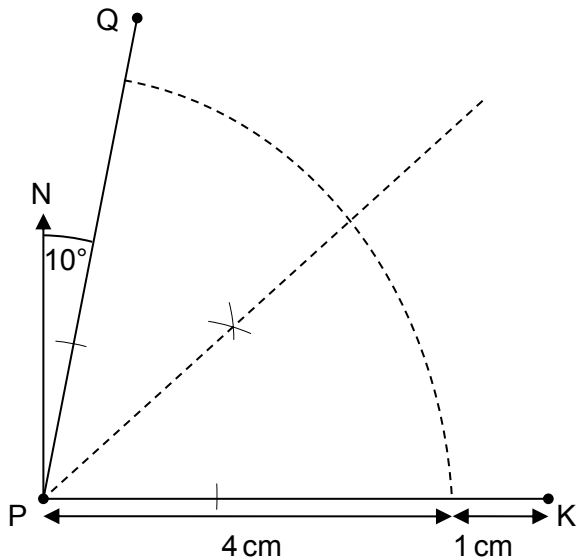
16. $\angle BDC = 90^\circ$ (angles on a straight line sum to 180°)
 $\angle DCB = (90 - b)^\circ$ (angles in a triangle (BDC) sum to 180°)
 $\angle DAB = x$ (alternate angles)
 $\angle ABD = (90 - x)^\circ$ (angles in a triangle (DAB) sum to 180°)
 $(90 - b) = (90 - x + b)$ (isosceles triangle)
 $\Rightarrow x = 2b$

17.



k is half the interior angle of the polygon (144°) so $k = 72^\circ$ (see diagram).
 Alternatively, work out angles in pentagon that contains k : $144 + 144 + 90 + 90 + k = 540$
 $\Rightarrow k = 72^\circ$

18.



19. $3x + 8 = 5x - 42$ (corresponding angles are equal when AB and CD are parallel)
 so $x = 25$.
20. Centre of square is (1, 1) so original square had centre (3, -2).

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