Properties of 2D and 3D shapes

Worked solutions

KS3 Maths topic practice

This topic online

1 Write down the mathematical name of a polygon with exactly five sides. (1 mark)

A polygon with five sides is called a pentagon

pentagon

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2 The diagram shows a circle with centre O.

a. Write down the mathematical name of each of the lines a, b and c.

b. What is the name for the distance all the way round a circle?

c. The radius of this circle is 3 cm. Write down the length of the diameter.

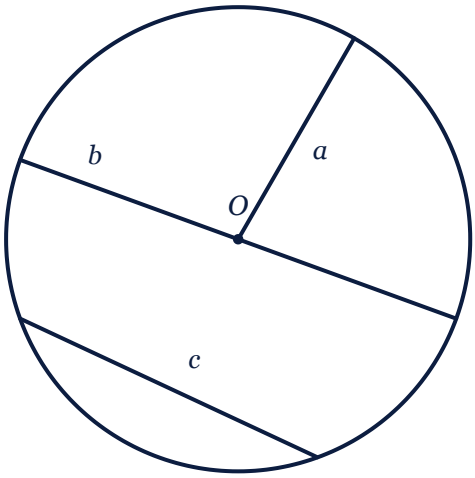

Diagram NOT accurately drawn

(4 marks)

a)

a goes from the centre to the edge: radius

b goes edge to edge through O: diameter

c goes edge to edge, not through O: chord

b)

The distance round is the circumference

c)

$d = 2r$

$d = 2 \times 3 = 6$

radius, diameter, chord; circumference; 6 cm

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3 The diagram shows the quadrilateral $ABCD$.

a. Write down the side that is parallel to AB.

b. Write down a side that is perpendicular to AB.

c. Write down the mathematical name of quadrilateral $ABCD$.

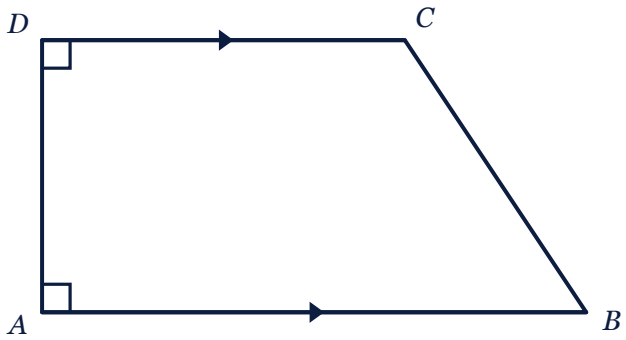

Diagram NOT accurately drawn

(3 marks)

a)

Matching arrows on AB and DC

DC

b)

Right angle at A, so AD ⊥ AB

AD

c)

Exactly one pair of parallel sides

Trapezium

4

a. A quadrilateral has exactly one pair of parallel sides. Write down the mathematical name of this quadrilateral.

b. A different quadrilateral has two pairs of parallel sides. All four of its sides are equal in length but none of its angles are right angles. Write down the mathematical name of this quadrilateral.

(2 marks)

A quadrilateral with exactly one pair of parallel sides is a trapezium

A quadrilateral with two pairs of parallel sides and four equal sides is a rhombus (it would only be a square if it also had right angles)

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5 Write down the mathematical name of each triangle.

a. All three sides are the same length.

b. None of the sides are the same length and none of the angles are the same size.

c. Two sides are the same length and one angle is 90°.

(3 marks)

a)

3 equal sides

Equilateral

b)

No equal sides, no equal angles

Scalene

c)

2 equal sides = isosceles

One angle 90° = right-angled

Right-angled isosceles

6 a. Write down the order of rotational symmetry of a regular hexagon.

b. Write down the number of lines of symmetry of a regular hexagon.

(2 marks)

A regular hexagon fits onto itself 6 times during a full turn, so its order of rotational symmetry is 6

A regular polygon has the same number of lines of symmetry as sides, so a regular hexagon has 6 lines of symmetry

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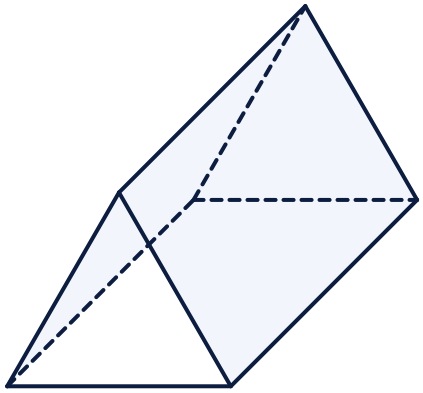
7 Here is a triangular prism.

a. Write down the number of faces of a triangular prism.

b. Write down the number of edges of a triangular prism.



(2 marks)

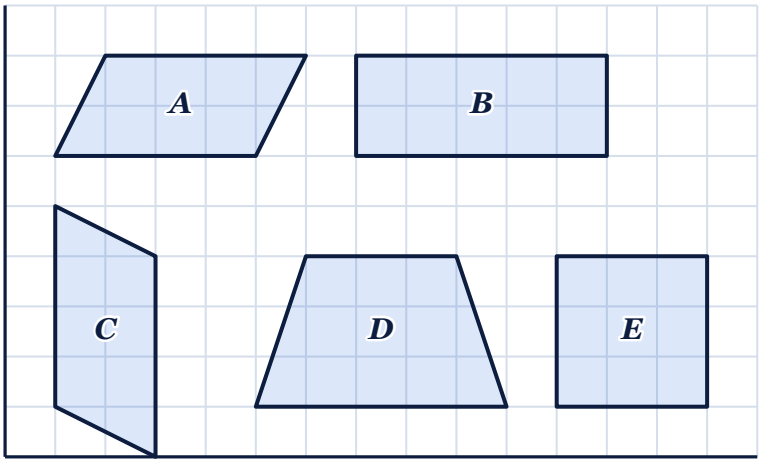
A triangular prism has 2 triangular faces and 3 rectangular faces, so 5 faces in total

It has 3 edges on each triangular end and 3 edges joining the two ends, so 3 + 3 + 3 = 9 edges

8 The diagram shows five quadrilaterals, labelled A, B, C, D and E, drawn on a centimetre grid.

a. Write down the letters of the pair of congruent quadrilaterals.

b. Write down the mathematical name of quadrilateral A.



(2 marks)

Congruent shapes are exactly the same shape and size. A and C are identical parallelograms, one rotated, so A and C are the congruent pair

Quadrilateral A has two pairs of parallel sides with no right angles, so it is a parallelogram

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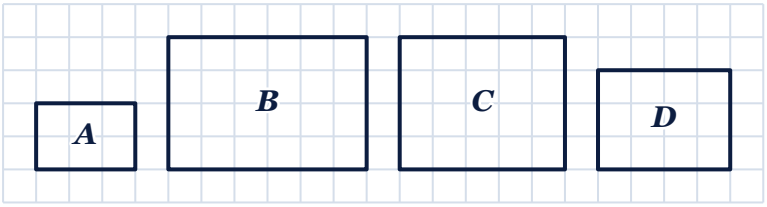
9 The diagram shows four rectangles, A, B, C and D, drawn on a centimetre grid.

a. Which rectangle is mathematically similar to rectangle A?

b. Explain why rectangle D is not similar to rectangle A.



(3 marks)

a)

A is 3 by 2

B is 6 by 4

3 x 2 = 6 and 2 x 2 = 4

B

b)

D is 4 by 3

4 ÷ 3 = 1.33...

3 ÷ 2 = 1.5

1 was added to each side, not multiplied

Not the same scale factor, so not similar

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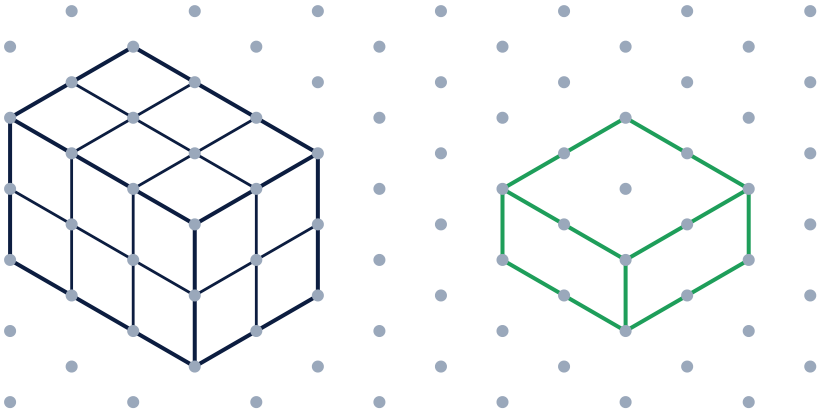
10 On the left of the isometric grid is a cuboid made from centimetre cubes.

a. Write down the length, width and height of the cuboid.

b. How many centimetre cubes make the cuboid?

c. On the right of the grid, draw a cuboid 2 cm long, 2 cm wide and 1 cm high.



(3 marks)

a)

3 along, 2 across, 2 up

3 cm by 2 cm by 2 cm

b)

One layer: 3 × 2 = 6

Two layers: 6 × 2 = 12

12 cubes

c)

Up edges go straight up, the rest follow the slanted dots

2 dots along, 2 dots across, 1 dot up

2 by 2 by 1 cuboid drawn

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11 The diagram shows a net. The faces are labelled A to F.

a. Write down the name of the 3D solid the net folds to make.

b. When the net is folded, which face is opposite face A?

c. Which face is opposite face C?

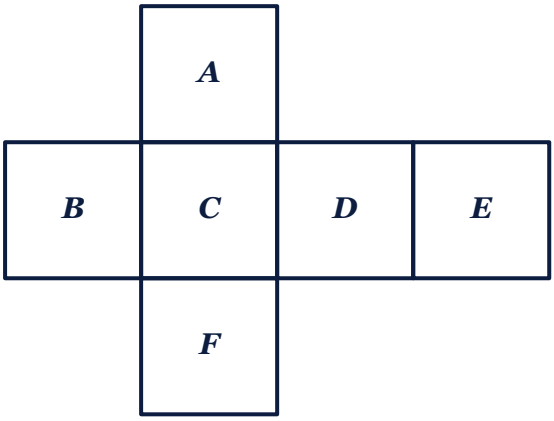

Diagram NOT accurately drawn

(3 marks)

a)

6 square faces

Cube

b)

Keep C on the table

A folds up at the back, F folds up at the front

F

c)

B and D fold up as the sides

E folds over from D to make the lid

E

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12 The diagram shows the net of a 3D solid. It is made from three rectangles and two equilateral triangles.

a. Write down the name of the solid.

b. Write down the number of edges the solid has.

c. Ravi says, "The solid has 6 faces." Is Ravi correct? Give a reason.

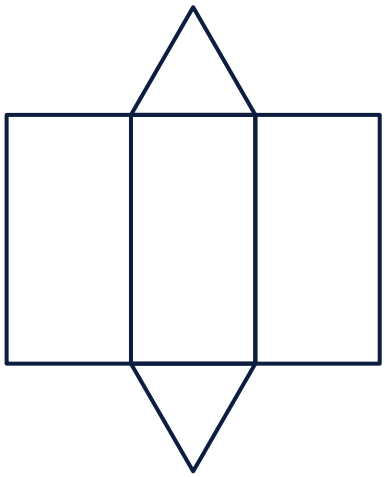

Diagram NOT accurately drawn

(3 marks)

a)

2 triangle ends, rectangles round the side

Triangular prism

b)

3 edges on each end: 3 + 3 = 6

3 edges along the length

6 + 3 = 9

9 edges

c)

Faces = shapes in the net

3 + 2 = 5

No, it has 5 faces

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