



AQA GCSE Maths: Higher



Your notes

Symmetry & Shapes

Contents

- * Rotational Symmetry
- * Lines of Symmetry
- * Planes of Symmetry
- * 2D Shapes
- * 3D Shapes
- * Plans & Elevations

Rotational Symmetry



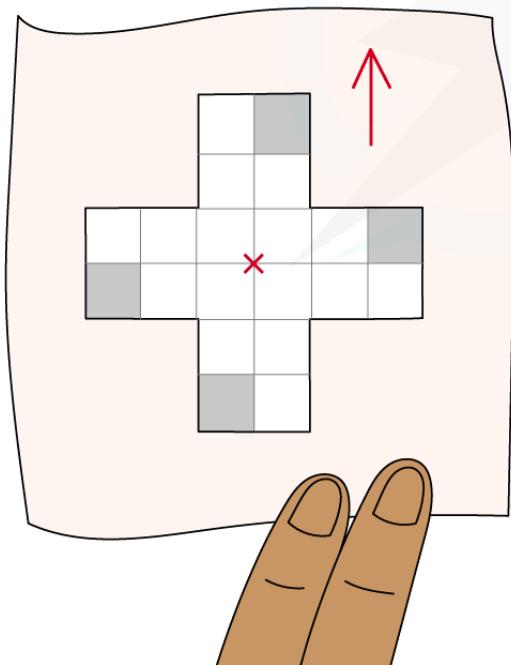
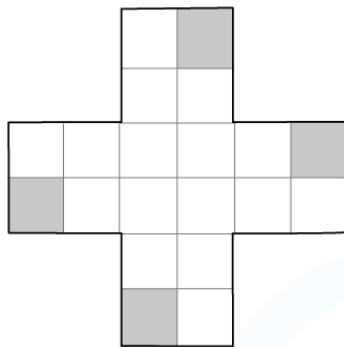
Your notes

Rotational Symmetry

What is the order of rotational symmetry?

- **Rotational symmetry** refers to the number of times a shape looks the same as it is **rotated 360°** about its **centre**
- This number is called the **order of rotational symmetry**
- Tracing paper can help work out the order of rotational symmetry
 - Draw an arrow on the tracing paper so you can easily tell when you have turned it through 360°

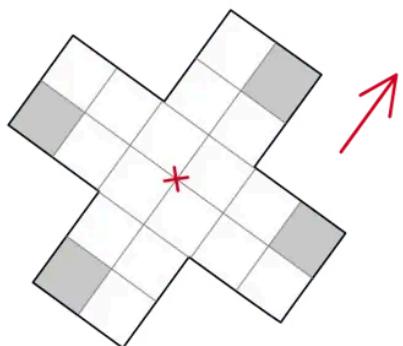
e.g. WRITE DOWN THE ORDER OF ROTATIONAL SYMMETRY OF THE FOLLOWING SHAPE.



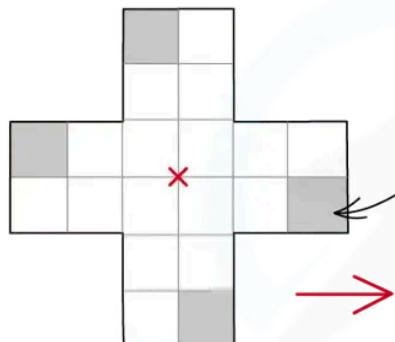
YOU CAN USE TRACING PAPER TO HELP. USE AN ARROW SO YOU KNOW WHEN YOU'RE BACK TO THE START.



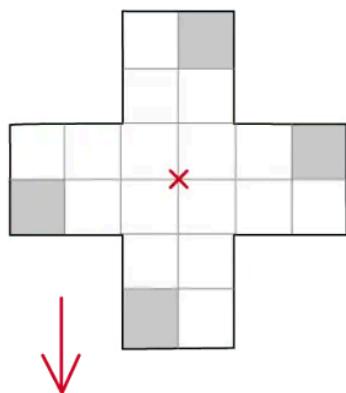
Your notes



...AS YOU TURN THE TRACING PAPER COUNT HOW MANY TIMES THE SHAPE LOOKS THE SAME AS THE ORIGINAL.



BE CAREFUL HERE. THIS SHADED SQUARE IS NOT QUITE THE SAME AS THE ORIGINAL.

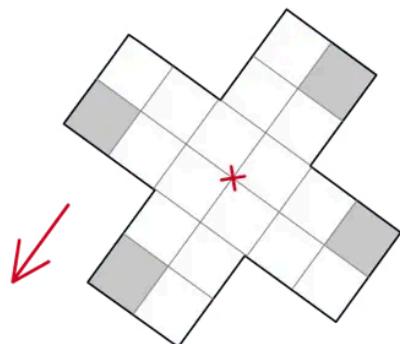


THIS IS THE SAME AS THE ORIGINAL (SO "1" SO FAR)

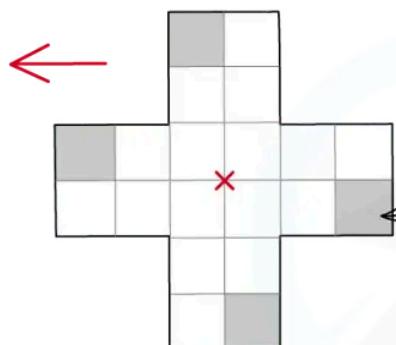
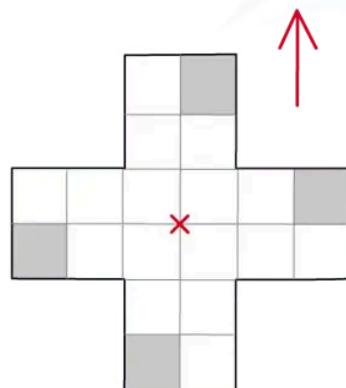
Copyright © Save My Exams. All Rights Reserved



Your notes



KEEP TURNING

NOT QUITE – ALWAYS BE
CAREFUL TO CHECK THE
ORIGINAL SHAPE."2"
BACK TO THE ORIGINAL
POSITION, ARROW FACING
UPWARDS. THIS COUNTS
TOWARDS THE ORDER OF
ROTATIONAL SYMMETRY.

THE SHAPE HAS ROTATIONAL SYMMETRY OF ORDER 2

Copyright © Save My Exams. All Rights Reserved

- Notice that returning to the original shape contributes 1 to the order
 - This means a shape can never have order 0

- A shape with **rotational symmetry order 1** may be described as **not** having any rotational symmetry
- The only time it looks the same is when you get back to the start



Your notes



Examiner Tips and Tricks

Remember to use the trick above; using an upwards arrow on the tracing paper to show the starting orientation of the shape.

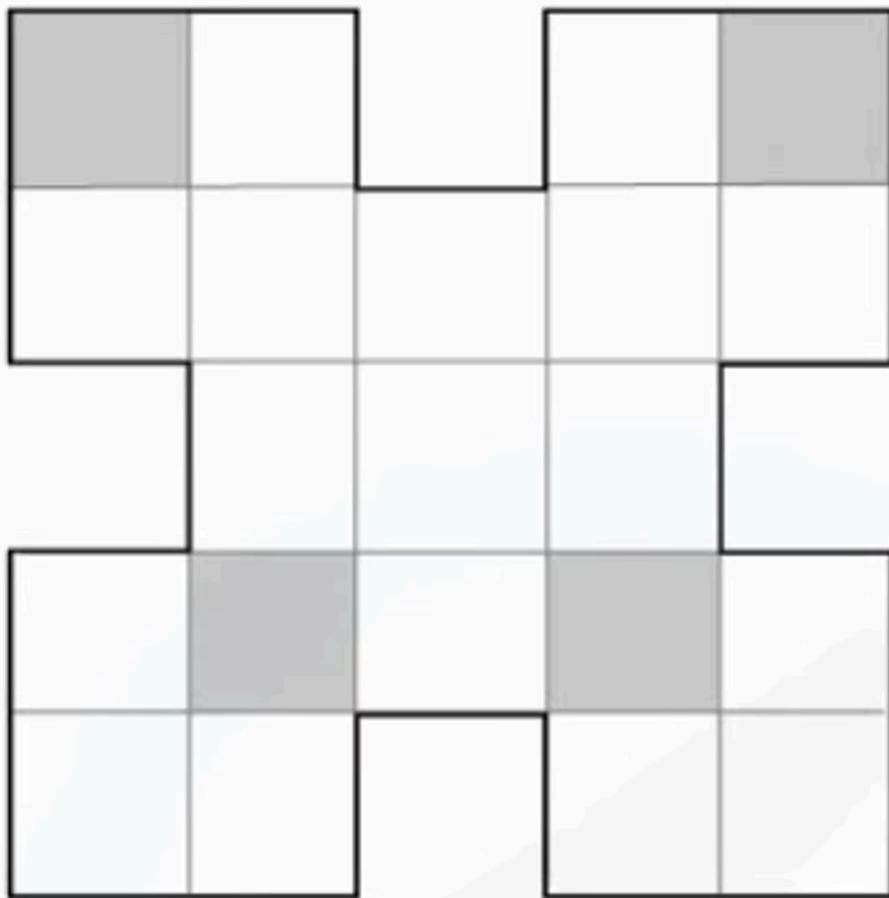


Worked Example

For the shape below, shade exactly 4 more squares so that the shape has rotational symmetry of order 4.



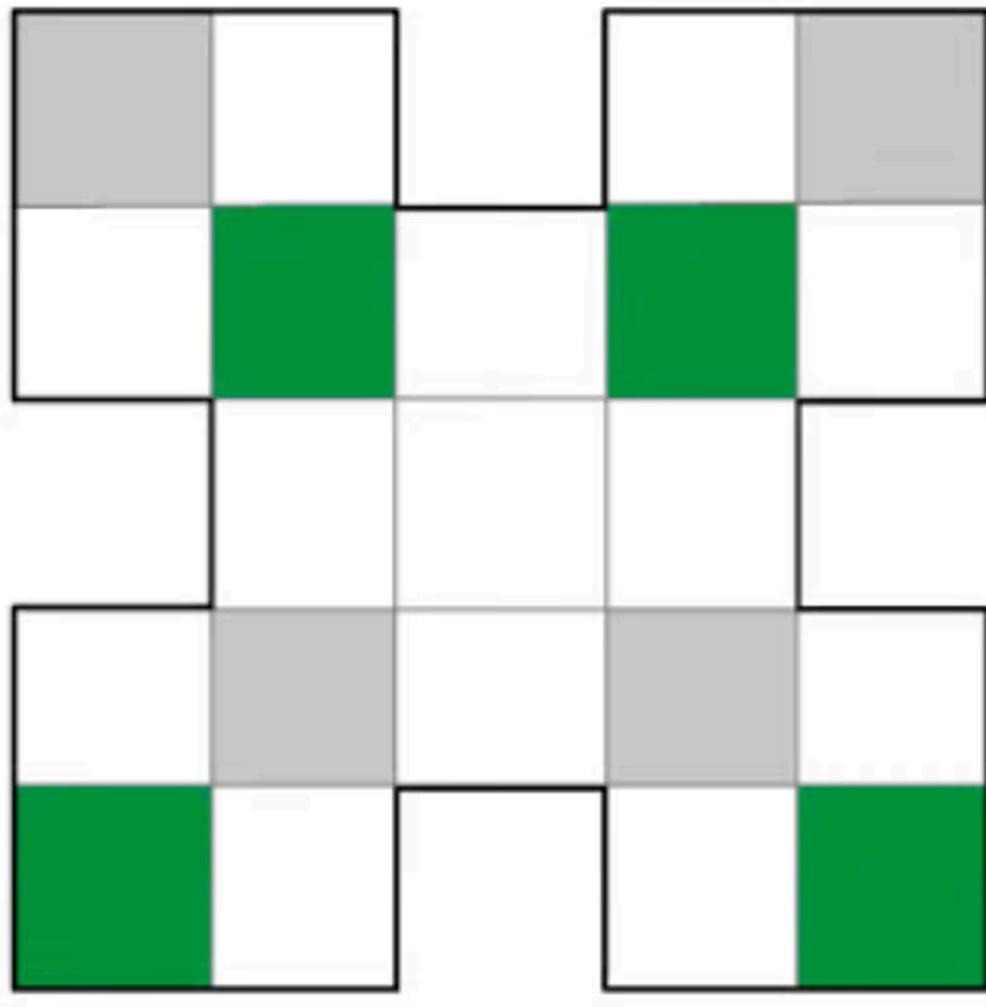
Your notes



The shape below appears the same 4 times if rotated through 360 degrees



Your notes



Lines of Symmetry



Your notes

Lines of Symmetry

What is line symmetry?

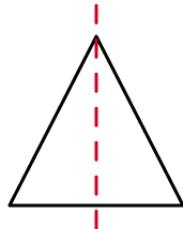
- **Line symmetry** refers to shapes that can have **mirror** lines added to them
 - Each side of the line of symmetry is a **reflection** of the other side
- Lines of symmetry can be thought of as a **folding** line too
 - **Folding** a shape along a line of symmetry results in the two parts sitting **exactly** on top of each other



Your notes

LINE SYMMETRY

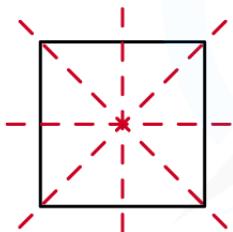
e.g.



ISOSCELES TRIANGLE
1 LINE OF SYMMETRY

IF YOU FOLD A SHAPE ALONG A LINE OF SYMMETRY.
ONE HALF WILL FIT EXACTLY ON TOP OF THE OTHER.

e.g.



SQUARE

4 LINES OF SYMMETRY



RECTANGLE

2 LINES OF SYMMETRY

ALTHOUGH A DIAGONAL WILL SPLIT A RECTANGLE IN HALF,
IT IS NOT A LINE OF SYMMETRY – IF YOU FOLD ALONG A
DIAGONAL IN A RECTANGLE THE TWO HALVES DO NOT
SIT ON TOP OF EACH OTHER.

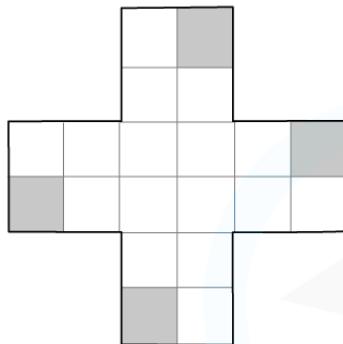
Copyright © Save My Exams. All Rights Reserved

- It can help to look at shapes from different angles; turn the page to do this

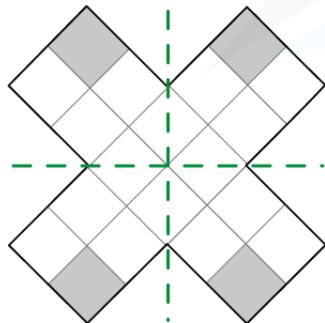


Your notes

e.g. DRAW IN ALL THE LINES OF SYMMETRY ON THE FOLLOWING SHAPE.



IT MAY HELP TO TURN THE PAGE TO HELP SEE BOTH LINE & ROTATIONAL SYMMETRY



THIS WAY UP MAKES IT EASIER TO SEE THE LINES OF SYMMETRY

Copyright © Save My Exams. All Rights Reserved

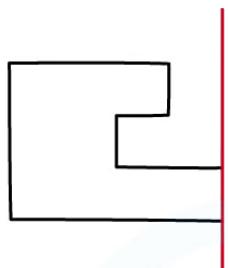
- Some questions will provide a portion of a shape and a line of symmetry, and you need to fill in the remaining half of the shape
- Be careful with **diagonal** lines of symmetry
 - Use tracing paper to trace the shape and then flip along the line of symmetry
- “**Two-way**” **reflections** (like part c below) occur if the line of symmetry passes **through** the shape



Your notes

e.g. COMPLETE THE SHAPES BELOW USING
THE LINES OF SYMMETRY

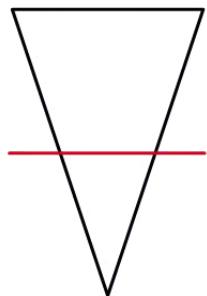
a)



b)



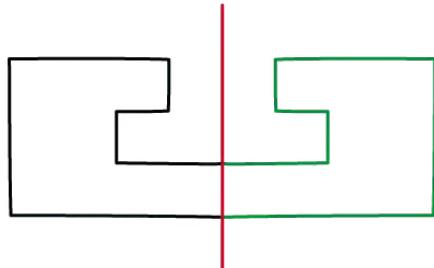
c)

Copyright © Save My Exams. All Rights Reserved

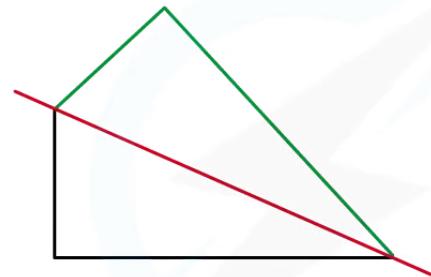


Your notes

a)

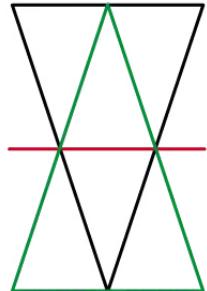


b)



A CLASSIC QUESTION!
DON'T FALL FOR IT!
A RECTANGLE DOES
NOT HAVE DIAGONAL
LINES OF SYMMETRY

c)



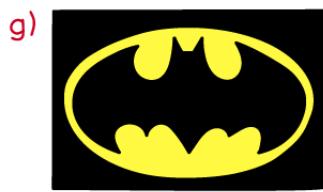
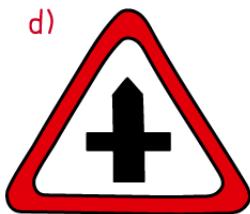
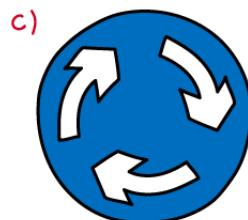
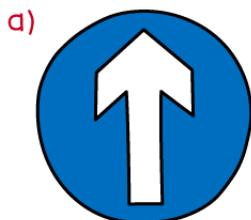
IF THE MIRROR LINE
PASSES THROUGH
THE SHAPE THERE
IS A "TWO WAY"
REFLECTION IN THE
LINE OF SYMMETRY



Your notes

LINE AND ROTATIONAL SYMMETRY ARE OFTEN INCORPORATED INTO ROAD SIGNS, FLAGS AND LOGOS

SEE IF YOU CAN SPOT LINE AND ROTATIONAL SYMMETRY IN THE SIGNS & LOGOS BELOW.



LINE SYMMETRY:
a) 1 b) 2 c) 0 d) 1 e) 1 f) 3 g) 1 h) 1 i) 2
ORDER OF ROTATIONAL SYMMETRY:
a) 1 b) 2 c) 0 d) 1 e) 1 f) 3 g) 1 h) 1 i) 2

Copyright © Save My Exams. All Rights Reserved



Examiner Tips and Tricks

- It can help to add the lines of symmetry to a diagram if one is given in a question
- You should be provided with tracing paper in the exam, use this to help you
 - You can request it if you are not given it at the start

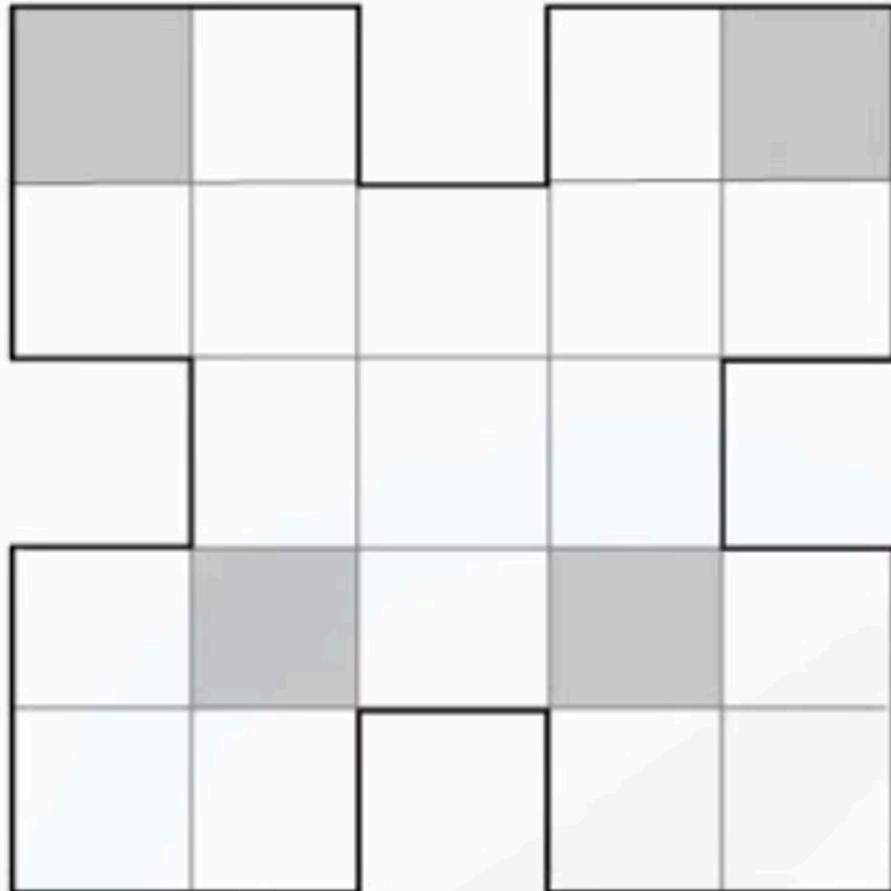


Your notes



Worked Example

Consider the shape below.

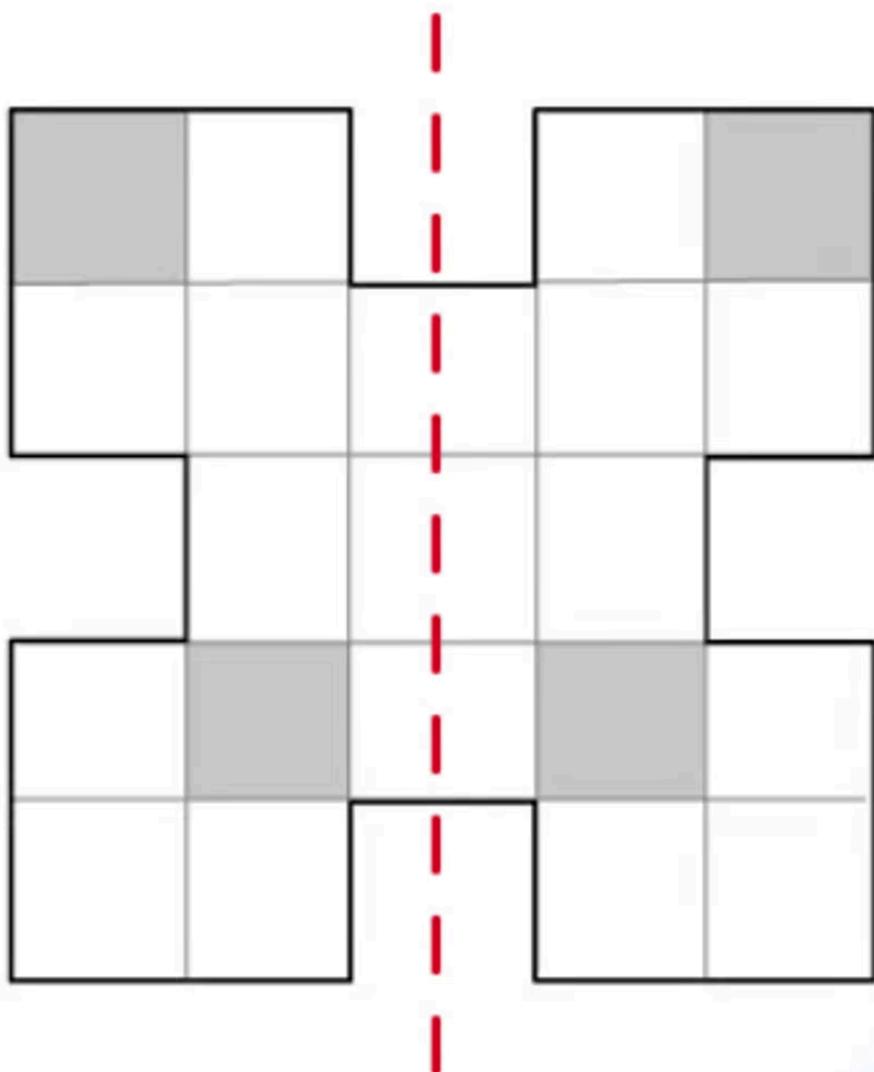


(a) Write down the number of lines of symmetry.

The only line of symmetry is shown below



Your notes



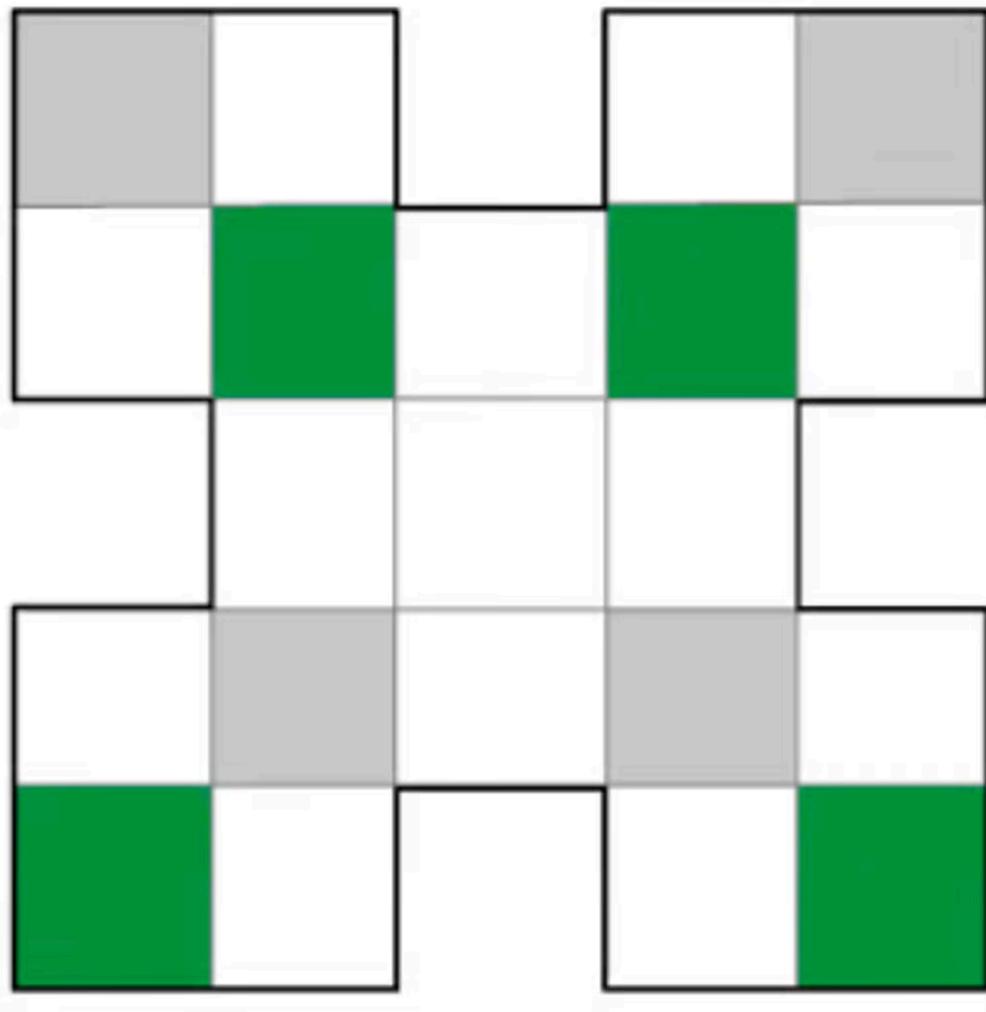
There is 1 line of symmetry.

(b) Shade exactly 4 more squares so that the shape has 4 lines of symmetry.

The shape below has a horizontal, a vertical, and 2 diagonal lines of symmetry



Your notes



Planes of Symmetry



Your notes

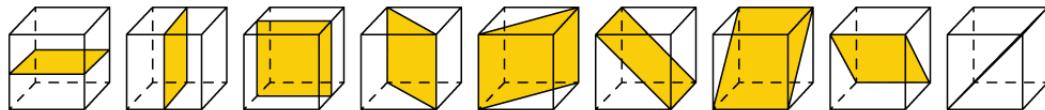
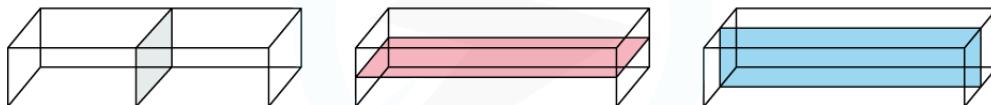
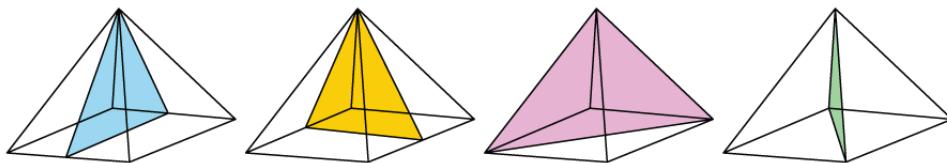
Planes of Symmetry

What is a plane of symmetry?

- A **plane** is a flat surface that can be any 2D shape
- A **plane of symmetry** is a **plane** that splits a 3D shape into two **congruent** (identical) halves
- If a 3D shape has a plane of symmetry, it has **reflection symmetry**
 - The two congruent halves are identical, mirror images of each other
- All **prisms** have at least one plane of symmetry
 - **Cubes** have 9 planes of symmetry
 - **Cuboids** have 3 planes of symmetry
 - **Cylinders** have an infinite number of planes of symmetry
 - The number of planes of symmetry in other prisms will be equal to the number of lines of symmetry in its cross-section plus 1
- **Pyramids** can have planes of symmetry too
 - The number of planes of symmetry in pyramids will be equal to the number of lines of symmetry in its 2D base
 - If the base of the pyramid is a **regular polygon** of n sides, it will have n planes of symmetry



Your notes

A CUBE HAS 9 PLANES OF SYMMETRY**A CUBOID HAS 3 PLANES OF SYMMETRY****A SQUARE BASED PYRAMID HAS 4 PLANES OF SYMMETRY**

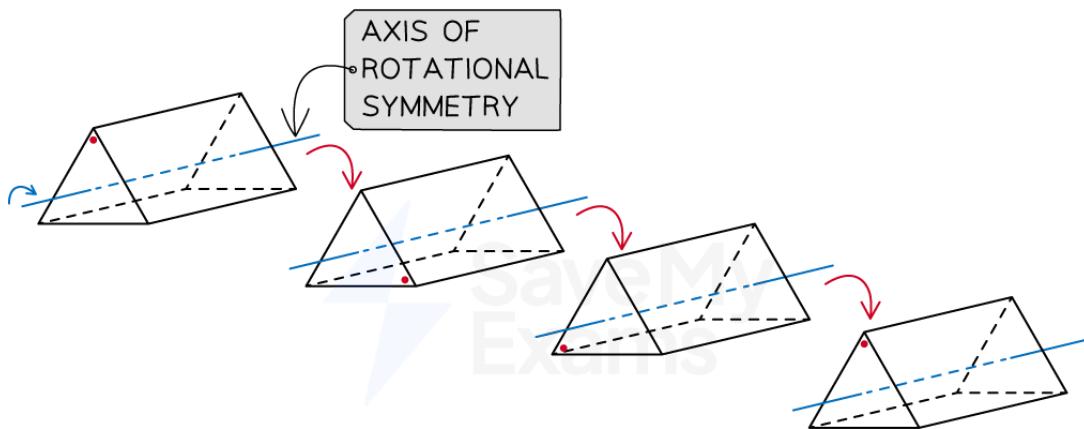
Copyright © Save My Exams. All Rights Reserved

Can a 3D shape have rotational symmetry?

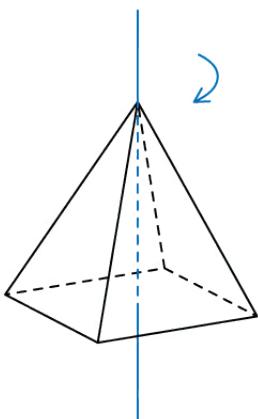
- 3D shapes are able to be **rotated around different axes**
 - Depending on which **axis** the shape is rotated around, **3D shapes can have rotational symmetry**
- Recall that **rotational symmetry** is how many times the shape looks the same (congruent) when rotated through 360 degrees
 - See the example of the triangular prism where the cross-section is an **equilateral triangle**



Your notes



A TRIANGULAR PRISM LOOKS THE SAME, 3 TIMES, AS IT IS ROTATED 360 DEGREES ABOUT THE AXIS SHOWN THEREFORE IT HAS ROTATIONAL SYMMETRY ORDER 3

Copyright © Save My Exams. All Rights Reserved

A SQUARE PYRAMID HAS ROTATIONAL SYMMETRY ORDER 4 ABOUT THE VERTICAL AXIS, AS ITS BASE IS A SQUARE

A CYLINDER HAS INFINITE ROTATIONAL SYMMETRY ABOUT THE VERTICAL AXIS, AS ITS CROSS SECTION IS A CIRCLE THIS WOULD ALSO BE TRUE FOR A CONE

Copyright © Save My Exams. All Rights Reserved



Examiner Tips and Tricks

- If you're unsure in the exam, consider the properties of the 3D shape.
 - Is it a **prism** or a **pyramid**?
 - How many **lines of symmetry** are there in the **2D faces** or **cross-section**?



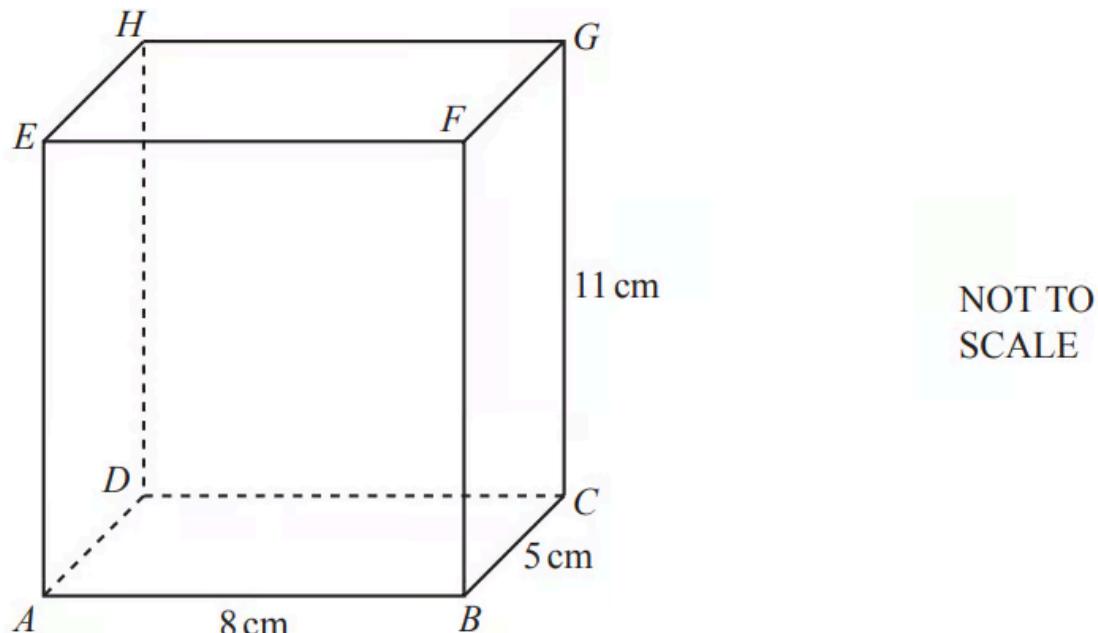
Your notes



Worked Example

The diagram below shows a cuboid of length 8 cm, width 5 cm and height 11 cm.

Write down the number of planes of symmetry of this cuboid.



A plane of symmetry is where a shape can be "sliced" such that it is symmetrical

A cuboid with three different pairs of opposite rectangles has 3 planes of symmetry

3 planes of symmetry

2D Shapes

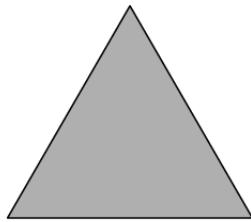


Your notes

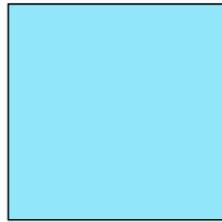
Properties of 2D Shapes

What are the names of common 2D shapes?

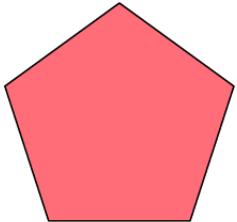
- You should know the general names of all the 2D **polygons**
 - A **triangle** has 3 sides
 - A **quadrilateral** has 4 sides
 - A **pentagon** has 5 sides
 - A **hexagon** has 6 sides
 - A **heptagon** has 7 sides
 - An **octagon** has 8 sides
 - A **nonagon** has 9 sides
 - A **decagon** has 10 sides
 - A **polygon** is a flat (plane) shape with n straight sides
 - A **regular polygon** has all sides the same length and all angles the same size



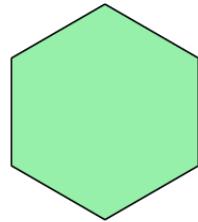
TRIANGLE



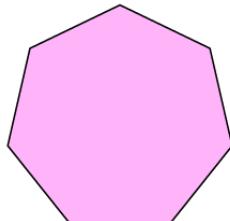
QUADRILATERAL



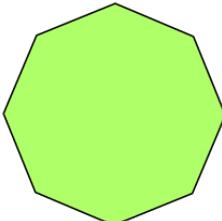
PENTAGON



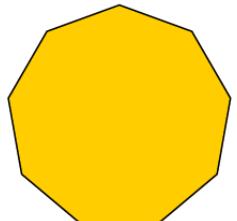
HEXAGON



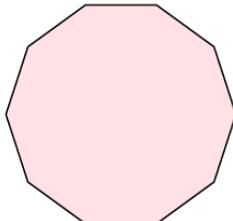
HEPTAGON



OCTAGON



NONAGON



DECAGON



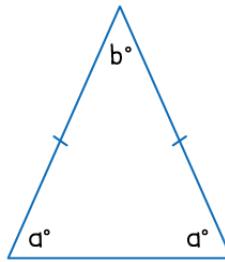
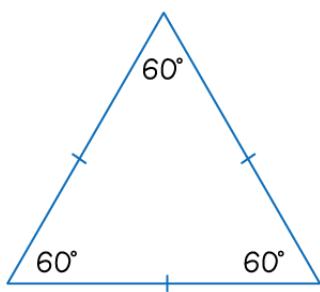
Your notes

What are the names of the different types of triangles?

- You should know the names and properties of the different types of **triangles**
 - An **equilateral** triangle has **3 equal sides** and **3 equal angles**
 - An **isosceles** triangle has **2 equal sides** and **2 equal angles**
 - A **right-angled** triangle has **one 90° angle**
 - A **scalene** triangle has **3 sides all of different lengths**



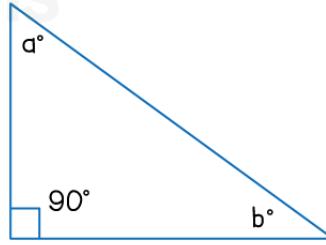
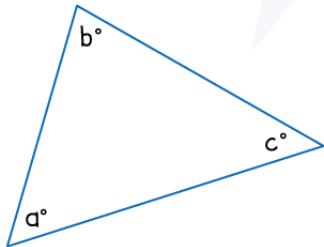
Your notes

**EQUILATERAL TRIANGLE**

THREE EQUAL SIDES AND
THREE EQUAL ANGLES
 $60 + 60 + 60 = 180$

ISOSCELES TRIANGLE

TWO EQUAL SIDES AND
TWO EQUAL ANGLES
 $a + a + b = 180$

**SCALENE TRIANGLE**

NO EQUAL SIDES
OR ANGLES
 $a + b + c = 180$

RIGHT-ANGLED TRIANGLE

ONE ANGLE = 90°
 $a + b + 90 = 180$
 $a + b = 90$

Copyright © Save My Exams. All Rights Reserved

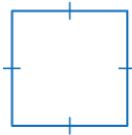
What are the names of the different types of quadrilaterals?

- You should know the names and properties of the different types of **quadrilaterals**
- These are **squares**, **rectangles**, **parallelograms**, **rhombuses**, **trapeziums** and **kites**



Your notes

TYPES OF QUADRILATERALS



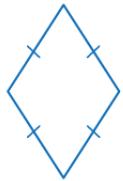
SQUARE
(A REGULAR QUADRILATERAL)



RECTANGLE



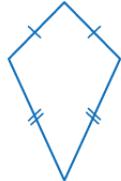
PARALLELOGRAM



RHOMBUS



TRAPEZIUM



KITE

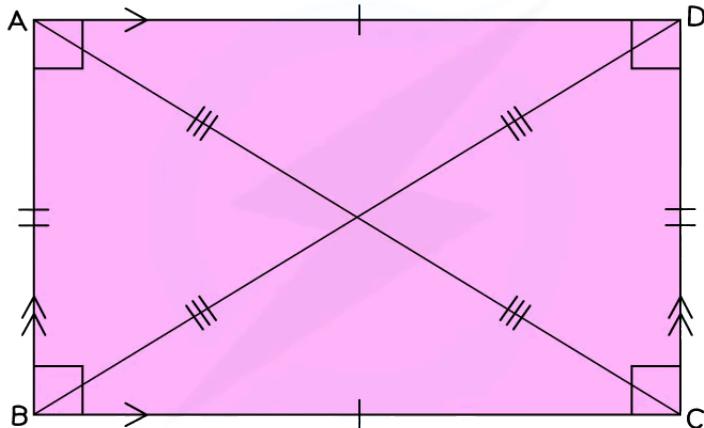
Copyright © Save My Exams. All Rights Reserved

What are the properties of rectangles and squares?

- Rectangles and squares have **four equal right angles** (90°)
- Rectangles have **two pairs of equal length**, parallel sides
 - Squares are just regular rectangles; all four of their sides are equal
- The **diagonals** of a rectangle **bisect** each other at the centre of the rectangle
 - This means that they cut each other in half
 - The intersecting diagonals form two pairs of angles at the centre
 - In a square, all four of these angles will be equal to 90°
- **Pythagoras' theorem** can be used to find the length of the diagonal of a square or rectangle
 - The diagonal forms the hypotenuse of a right-angled triangle



Your notes

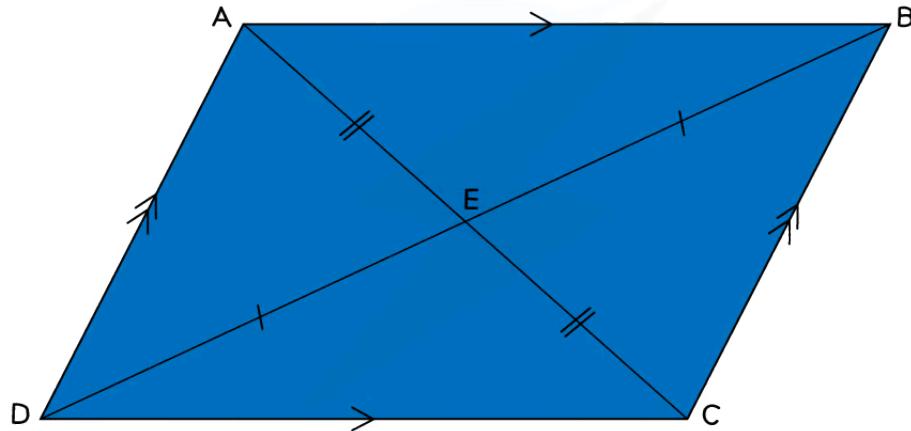


What are the properties of parallelograms and rhombuses?

- Parallelograms and rhombuses (rhombi) have **two pairs of equal, opposite, angles**
- Parallelograms and rhombuses have **two pairs of opposite, parallel sides**
- Rhombuses have **four sides of the same length**
 - This means a rhombus is a regular parallelogram
 - A square is also a regular rhombus
- The **diagonals** of a parallelogram **bisect** each other, forming two pairs of opposite angles
- The **diagonals** of a **rhombus bisect** each other at **right angles** (90°)
 - This means that they cut each other in half
 - The diagonals will not be of equal length
 - On the diagram below, the diagonal AC is shorter than the diagonal DB



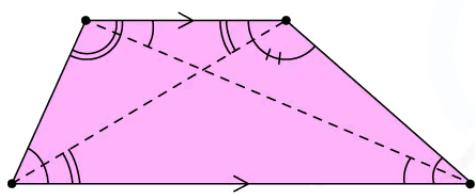
Your notes



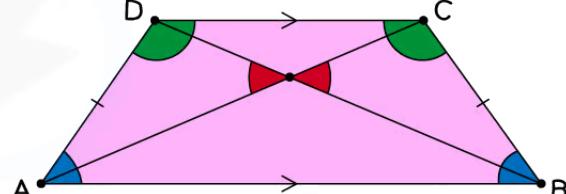
What are the properties of trapeziums?

- Trapeziums have **one pair of opposite, parallel sides**
 - These are **not of equal length**
- Trapeziums may not have any equal angles
 - As with all quadrilaterals, the angles add up to 360°
- If a trapezium has a line of symmetry, it is classed as **isosceles**
 - Isosceles trapezia have two pairs of equal angles
 - The non-parallel sides in an isosceles trapezium will be equal length
 - An isosceles trapezium has two diagonals of equal length

TRAPEZIUM



ISOSCELES TRAPEZIUM

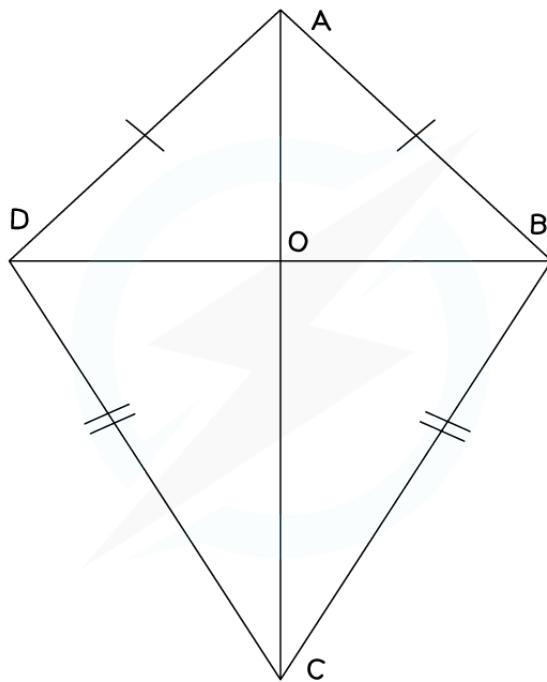


What are the properties of kites?



Your notes

- Kites have **one line of symmetry**, known as their **main diagonal**
- The angles **opposite** the main diagonal are equal
 - These are angles ABC and ADC on the diagram below
- The diagonals of a kite **bisect** each other at **right angles** (90°)
 - This means that they cut each other in half
 - The diagonals will not be of equal length
- Kites have **no parallel sides**
- Kites have **two pairs of equal length**, adjacent sides

Copyright © Save My Exams. All Rights Reserved

Examiner Tips and Tricks

- Remember the **key properties** of each shape

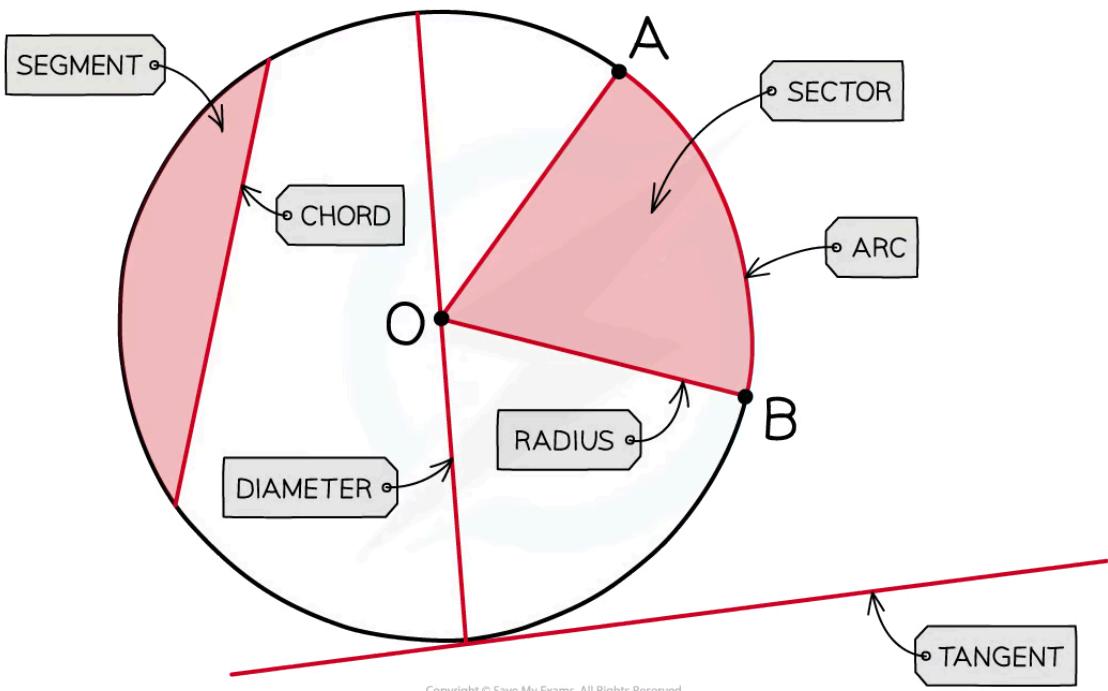


Your notes

- You may need to use these facts to help work out more tricky geometry problems

What terms related to circles do I need to know?

- Circles have several specific terms that you need to be familiar with:
 - A circle's perimeter is called a **circumference**
 - Its line of symmetry is called a **diameter**
 - The line from the centre of the circle to its circumference is called a **radius**
 - The **diameter** is equal to $2 \times$ the **radius**
 - A portion of the circumference is called an **arc**
 - A portion of the area, contained between two radii and an arc, is called a **sector**
 - A line between two points on the circumference is called a **chord**
 - The area formed between a chord and an arc is called a **segment**
 - A line which intersects the circumference at one point only, is called a **tangent**



Copyright © Save My Exams. All Rights Reserved



Your notes

- The ratio $\frac{\text{circumference}}{\text{diameter}}$ is equal to π (3.14159...)
- **Circles** have many angle properties and you will need to learn some of them
 - These properties are known as **circle theorems**



Examiner Tips and Tricks

- Always double check if a measurement is the **diameter or the radius**
 - This is a really common error in exams
 - Diameter = $2 \times$ Radius

3D Shapes

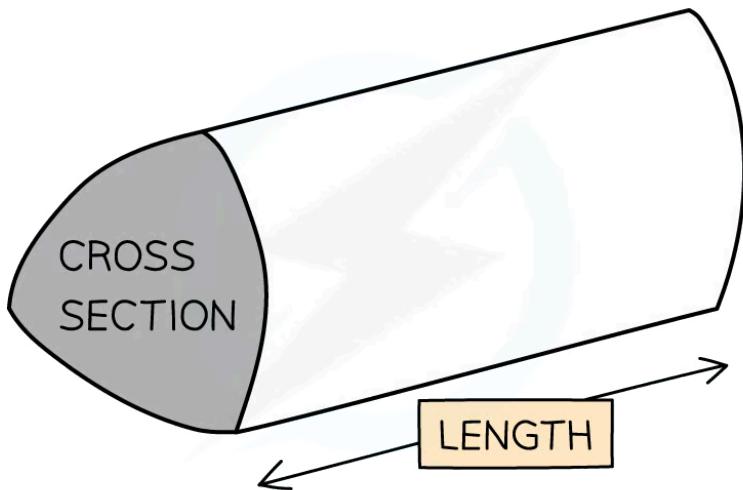


Your notes

Properties of 3D Shapes

What common 3D shapes do I need to know about?

- There are a number of **common 3D shapes**
 - You should know their **names**
 - and their **key properties**
- A **prism** is a 3D shape with the same **cross-section** throughout
 - The cross-section of a **cube** is a **square**
 - The cross-section of a **cuboid** is a **rectangle**
 - There are **other prisms**, such as **triangular prisms** or **hexagonal prisms**
 - In these cases the exam question will make sure the shape of the cross-section is clear

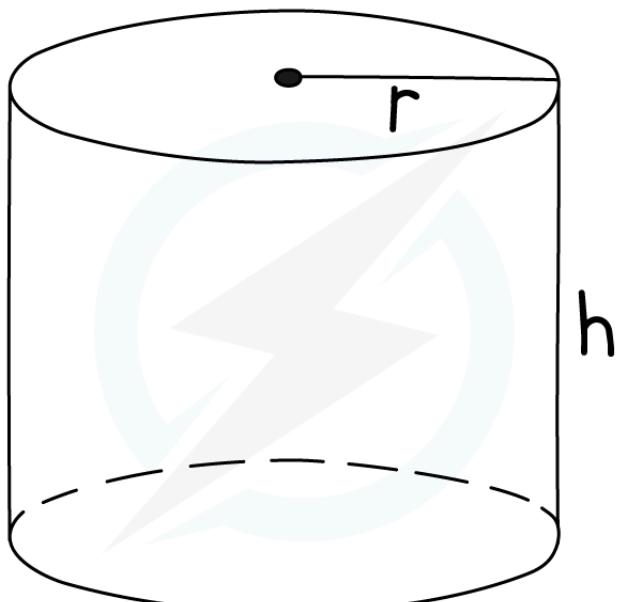


Copyright © Save My Exams. All Rights Reserved

- A **cylinder** is similar to a prism
 - The cross-section of a **cylinder** is a **circle**



Your notes

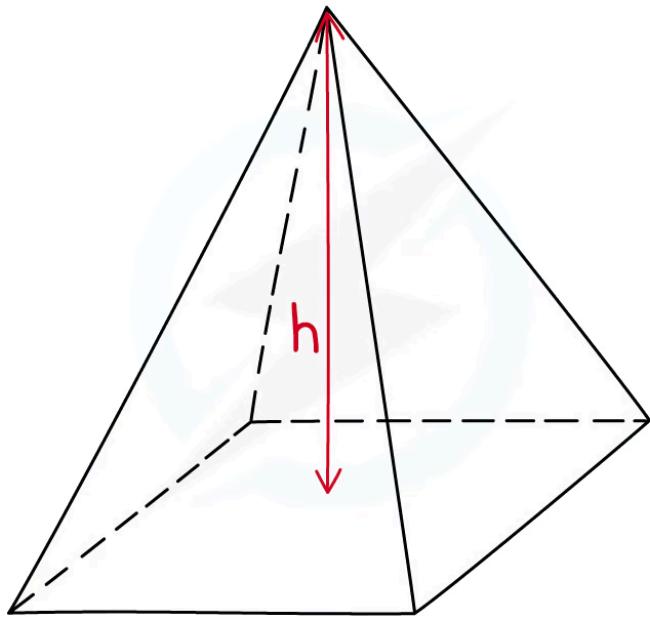


Copyright © Save My Exams. All Rights Reserved

- There are a number of different types of **pyramid**
 - A **pyramid** has a flat base and sloping sides that meet at a point
 - The pyramid may have a **square, rectangular** or **triangular** base
 - Some pyramids have special names you should know
 - A triangular-based pyramid is called a **tetrahedron**



Your notes

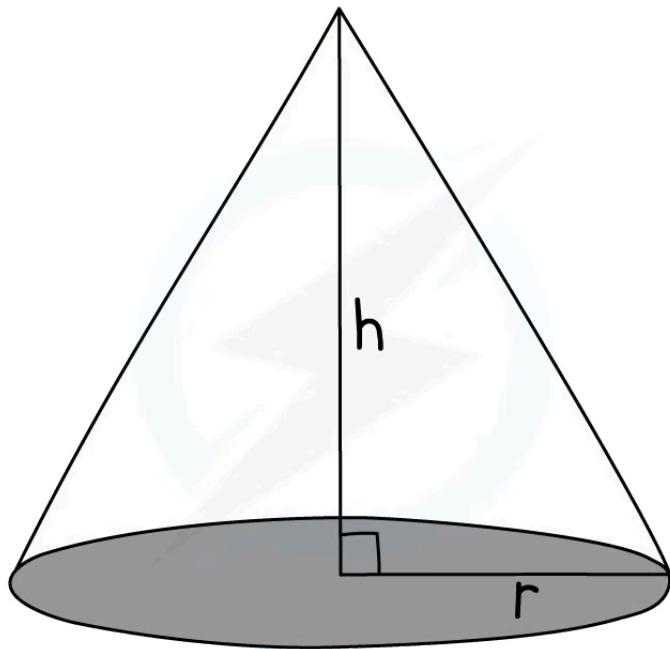


Copyright © Save My Exams. All Rights Reserved

- A **cone** is similar to a pyramid
 - A **cone** has a circular base



Your notes

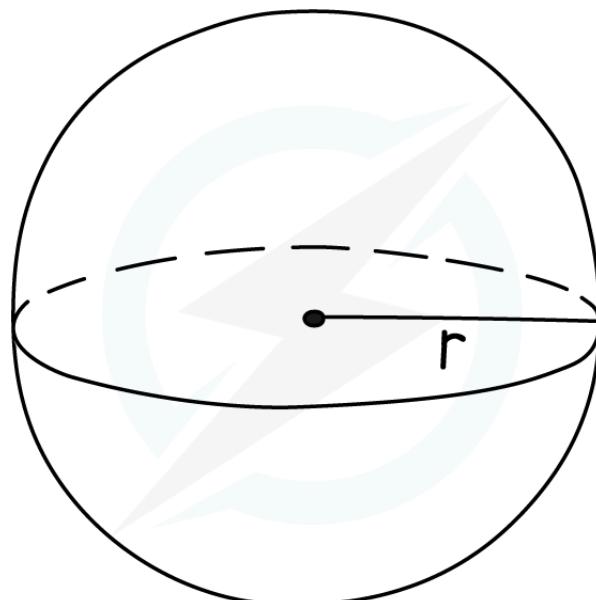


Copyright © Save My Exams. All Rights Reserved

- A **sphere** is a round solid ball shape



Your notes



Copyright © Save My Exams. All Rights Reserved

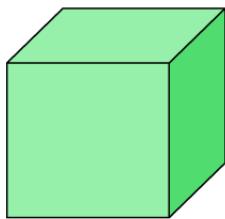
What are the properties of 3D shapes?

- 3D shapes have a number of **faces**, **vertices** and **edges**
 - A **face** is a single flat surface of the 3D shape
 - A **vertex** (plural, **vertices**) is a corner of the 3D shape
 - An **edge** joins one vertex to another
- You should know the number and shape of the faces (and other surfaces) for the common 3D shapes
 - A **cube** has 6 equal, square faces
 - A **cuboid** has 3 pairs of rectangular faces
 - A **cylinder** has 2 equal circular faces and 1 curved surface
 - The curved surface has the shape of a rectangle if laid out flat
 - A **triangular prism** has 2 equal triangular faces and 3 rectangular faces
 - If the triangular faces are **equilateral** then all of the **rectangles will be equal**
 - If the triangular faces are **isosceles** then two of the **rectangles will be equal**

- A **square-based pyramid** has 1 square face and 4 equal triangular faces
- A **tetrahedron** has 4 triangular faces
- A **sphere** has 1 curved surface; it is a ball shape



CUBE



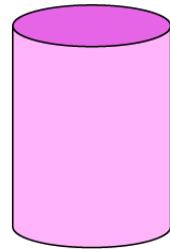
6 FACES
12 EDGES
8 VERTICES

CUBOID



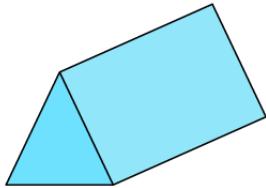
6 FACES
12 EDGES
8 VERTICES

CYLINDER



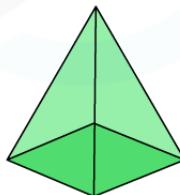
3 FACES
2 EDGES
0 VERTICES

TRIANGULAR PRISM



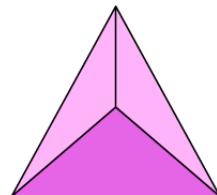
5 FACES
9 EDGES
6 VERTICES

SQUARE-BASED PYRAMID



5 FACES
8 EDGES
5 VERTICES

TETRAHEDRON



4 FACES
6 EDGES
4 VERTICES

Copyright © Save My Exams. All Rights Reserved



Examiner Tips and Tricks

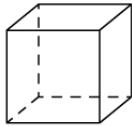
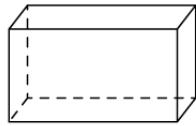
- Remembering the properties of 3D shapes will help in particular with questions involving surface area

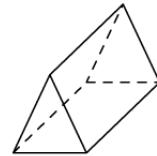
What is a net of a solid?



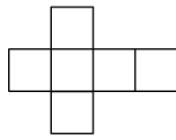
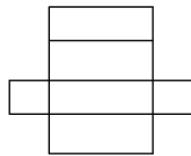
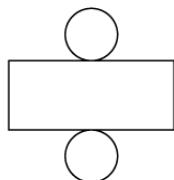
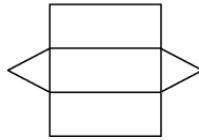
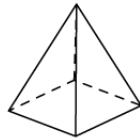
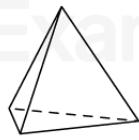
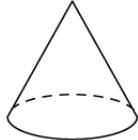
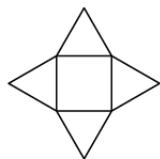
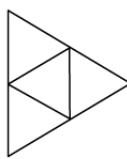
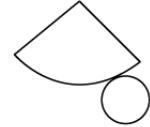
Your notes

- A **net** of a solid is a **2D drawing** that can be cut out and folded **to make a 3D shape**
- Each of the faces of the 3D shape are arranged in a certain pattern
 - Not every arrangement of the faces will create a net of that solid
 - Solids can have **more than one** arrangement that will work to make the 3D shape
- The **area** of the **net of a 3D shape** is the same as the **surface area** of the solid


CUBE

CUBOID

CYLINDER

TRIANGULAR PRISM


Your notes


6 SQUARES

3 PAIRS OF RECTANGLES

**1 RECTANGLE,
2 CIRCLES**

**3 RECTANGLES,
2 TRIANGLES**

SQUARE-BASED PYRAMID

TETRAHEDRON

CONE

**1 SQUARE,
4 TRIANGLES**

4 TRIANGLES

**1 CIRCLE
1 SECTOR**
Copyright © Save My Exams. All Rights Reserved

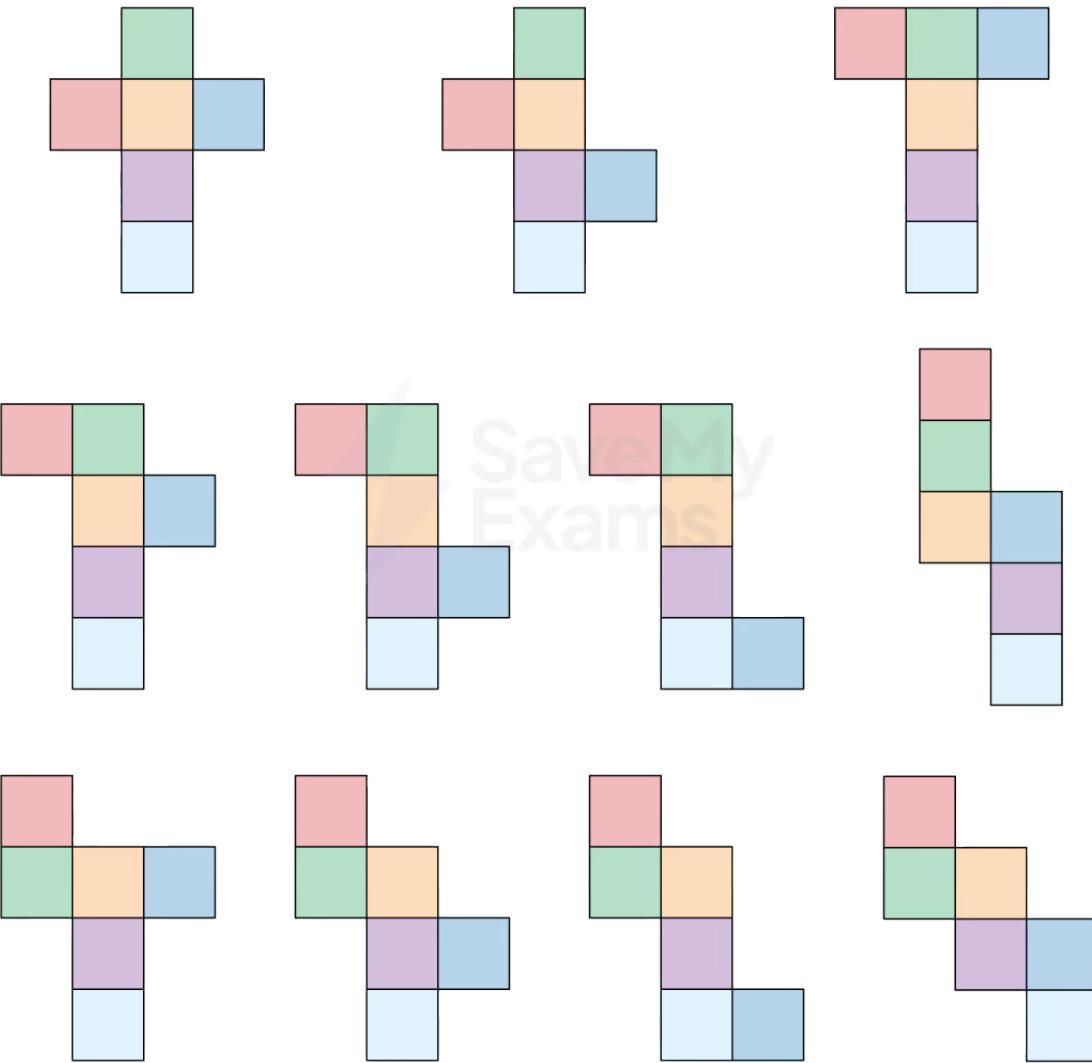
What does the net of a cube or cuboid look like?

- The net of a **cube** has 6 squares connected at certain edges
- There are **11 different arrangements** of the square faces that will form a net of a cube



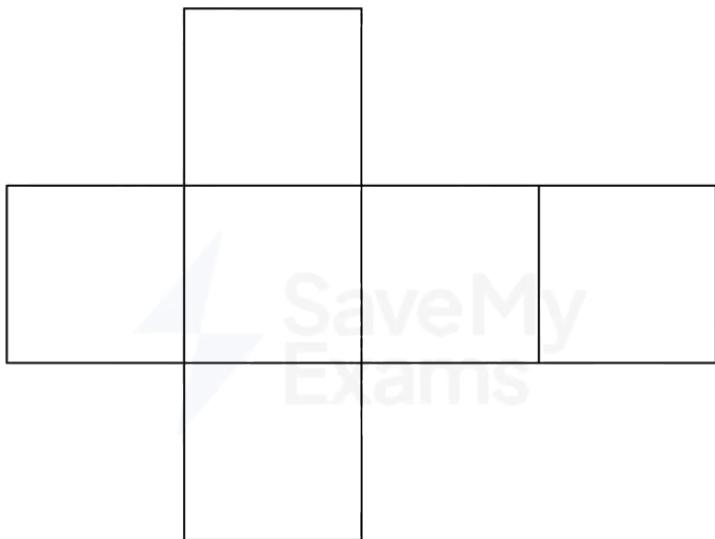
Your notes

NETS OF A CUBE



Copyright © Save My Exams. All Rights Reserved

- The **most common** and **easiest to remember** is in the form of a cross



Your notes

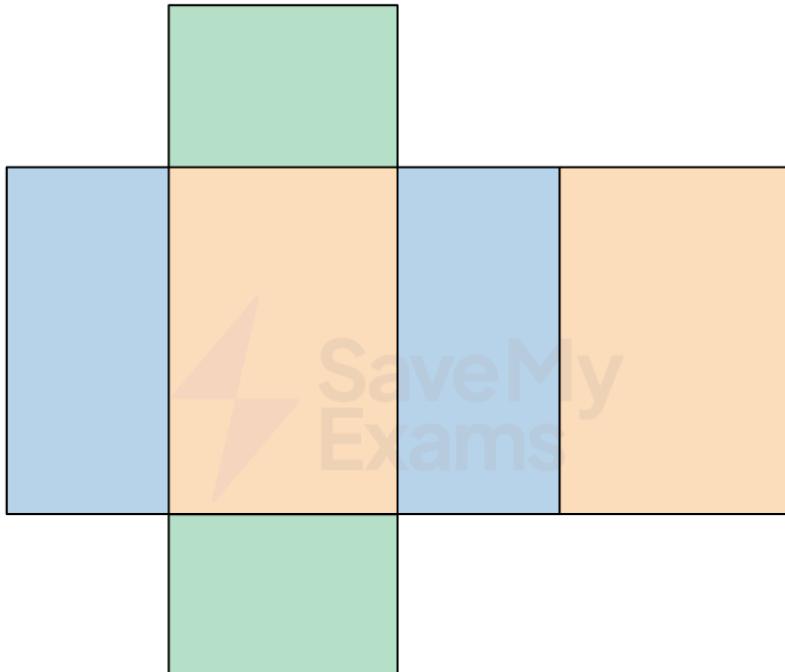
NET OF A CUBE

Copyright © Save My Exams. All Rights Reserved

- A **cuboid** has 6 rectangular faces, so its net consists of 6 rectangles
- The most common and easiest net to remember is in the form of a cross
 - Pay attention to which rectangles are the same
 - They are colour-coded in the diagram below



Your notes



NET OF A CUBOID

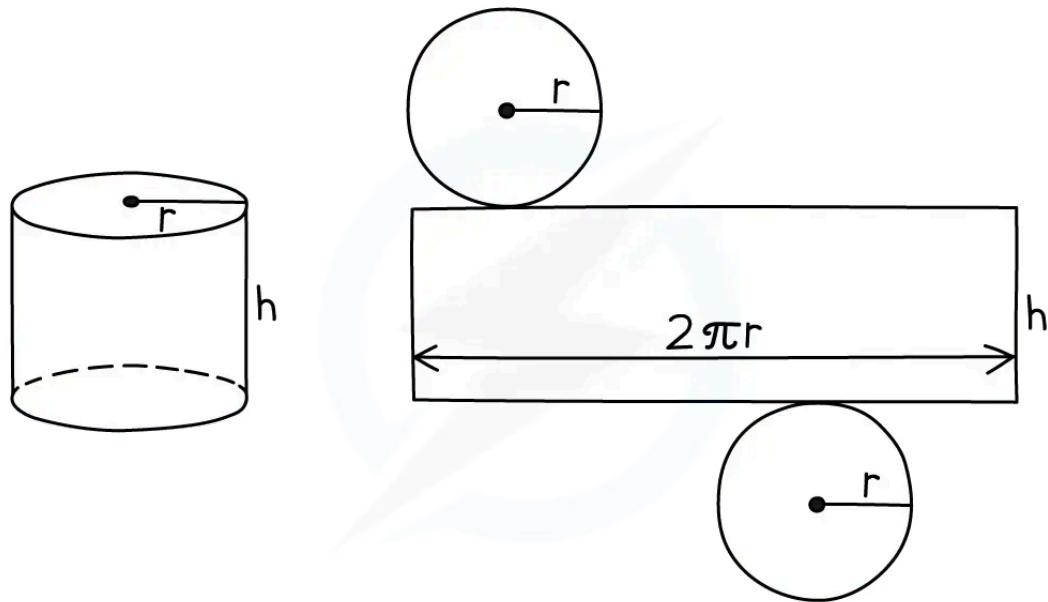
Copyright © Save My Exams. All Rights Reserved

What does the net of a cylinder look like?

- The net of a **cylinder** consists of two circles and a rectangle
- The **length** of the rectangle is equal to the **circumference** of the circles
 - Circumference = $2 \times \pi \times \text{radius}$
- The **width** of the rectangle is equal to the **height** of the cylinder

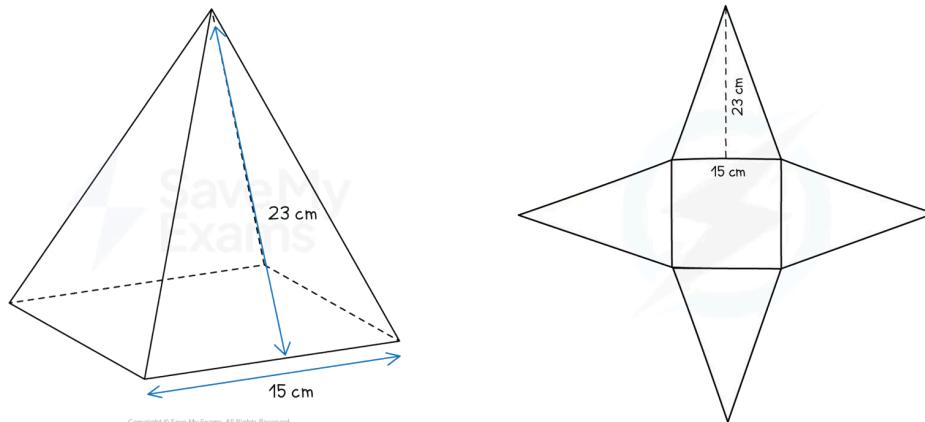


Your notes


Copyright © Save My Exams. All Rights Reserved

What does the net of a pyramid look like?

- The net of a **pyramid** consists of the base and a triangle attached to each edge of the base
- For example, a **square-based pyramid** has a square base and four congruent (identical) triangles
 - The **perpendicular height** of each triangle is equal to the **slant height** of the pyramid


Copyright © Save My Exams. All Rights Reserved



Examiner Tips and Tricks

- You may be given the dimensions of the solid when asked to draw a net
 - Make sure you put the correct lengths in the correct places by imagining cutting out and folding up the net



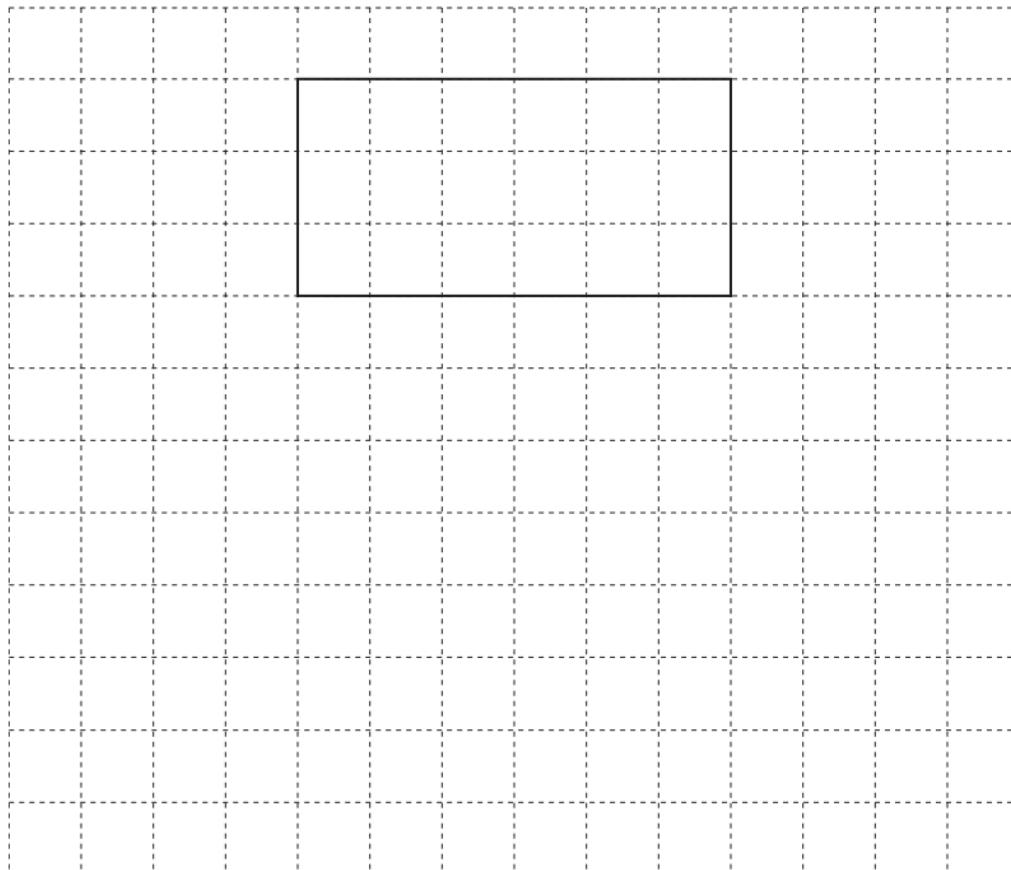
Your notes



Worked Example

A cuboid measures 6 cm by 3 cm by 2 cm.

On the 1cm^2 grid, draw an accurate net of this cuboid. One face has been drawn for you.

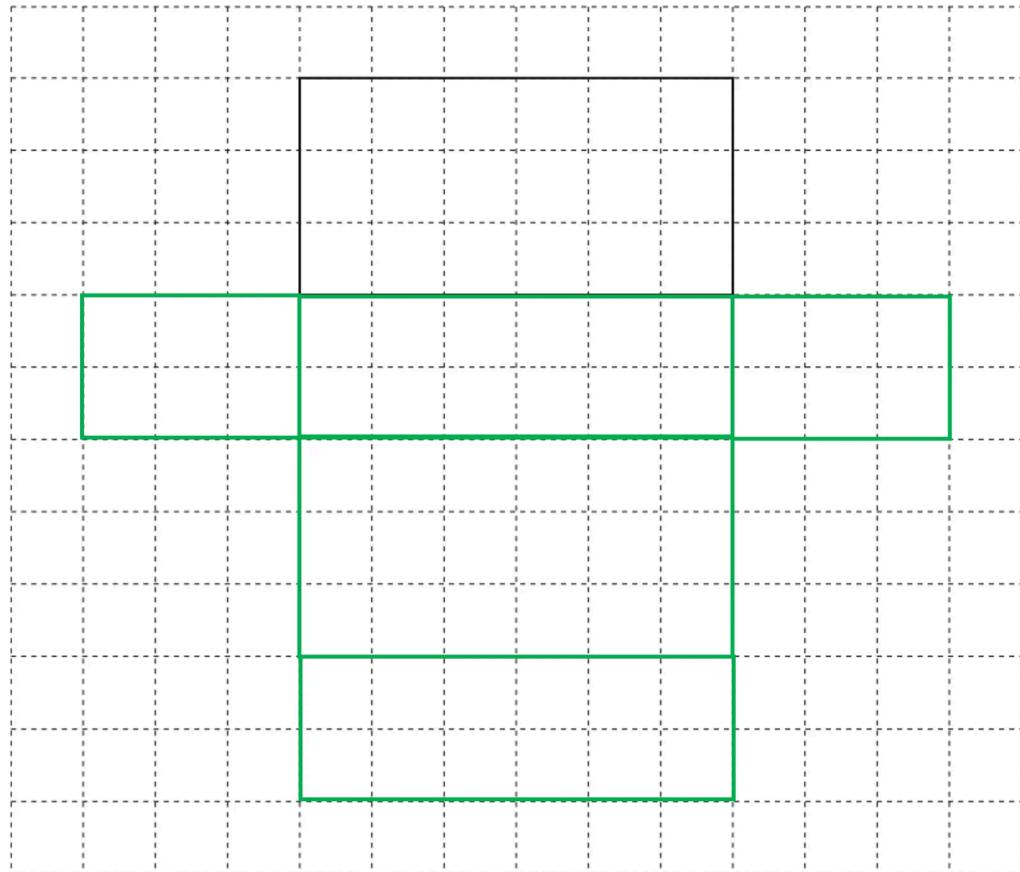


The cuboid has three pairs of rectangles; measuring 6 cm by 3 cm, 6 cm by 2 cm, and 3 cm by 2 cm

Make sure the net has two of each of these rectangles in the correct places



Your notes



Plans & Elevations



Your notes

Plans & Elevations

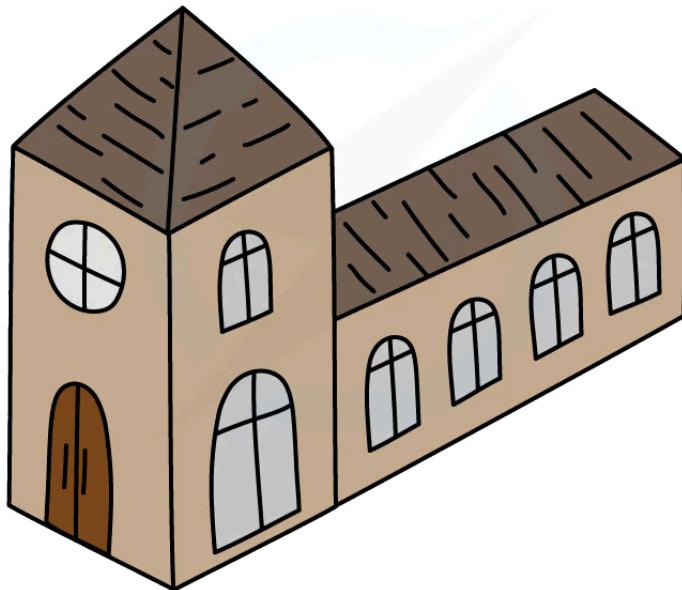
What are plans and elevations?

- They are **two-dimensional views** of a **three-dimensional object**
- They are the mathematical shapes you would see when looking directly at a 3D object from a given direction

How do I draw plans and elevations?

- Consider looking at a 3D object, such as a building
 - consider the different directions you could look at the object **from**
 - There is the **front** view, the **side** view and the **plan** view from **directly above**

CHURCH 3D



Copyright © Save My Exams. All Rights Reserved

- The view you would see looking **directly down** on an object is called the **plan view**
 - This is commonly known as a **bird's-eye-view**



Your notes

CHURCH PLAN



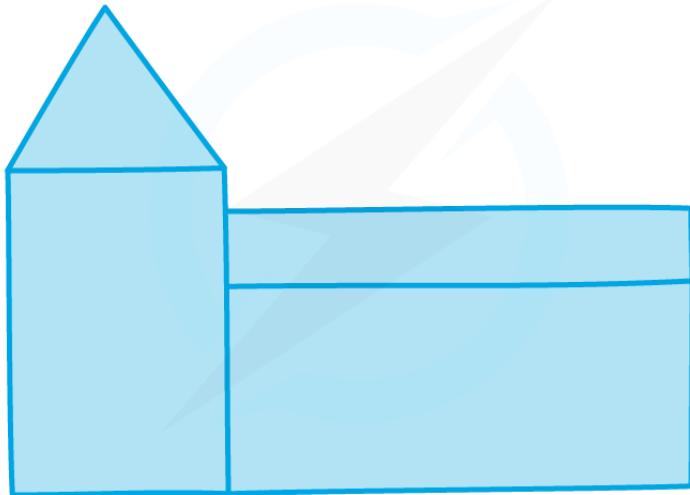
Copyright © Save My Exams. All Rights Reserved

- The shape you would see stood directly in front of the object is called the **front elevation**



Your notes

CHURCH FRONT



Copyright © Save My Exams. All Rights Reserved

- The shape you would see directly facing the side of the object is called the **side elevation**



Your notes

CHURCH SIDE



Copyright © Save My Exams. All Rights Reserved



Examiner Tips and Tricks

- These questions often require your answer to be drawn on a grid, using the grid as a scale
 - It is a good idea to roughly sketch out your answer first – on the side of the page or on a separate sheet
- With isometric drawings, it's helpful to colour-code the three views on the diagram
 - This will make it easier for you to see the three elevations and any 'hidden' parts
 - If you don't have colours you can use different types of shading (stripes etc)

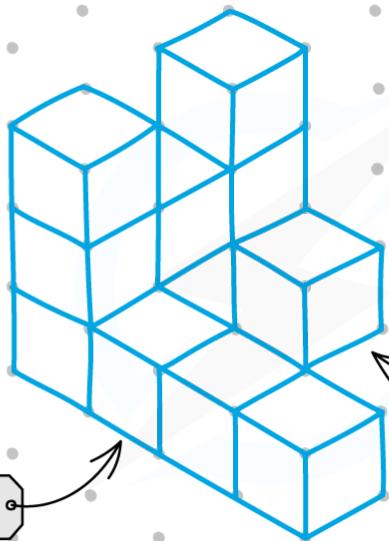


Worked Example

Using squared paper draw the plan, front and side elevations of the object shown below on isometric paper.



Your notes



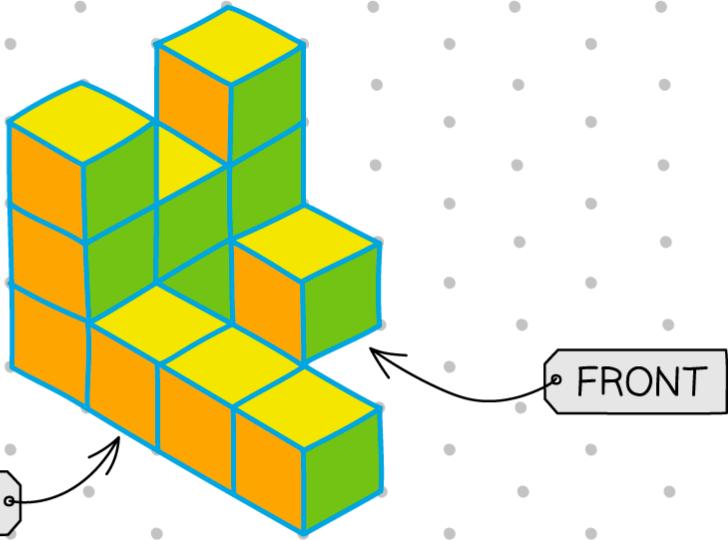
Copyright © Save My Exams. All Rights Reserved



It can be helpful to colour each of the three views in three different colours.



Your notes

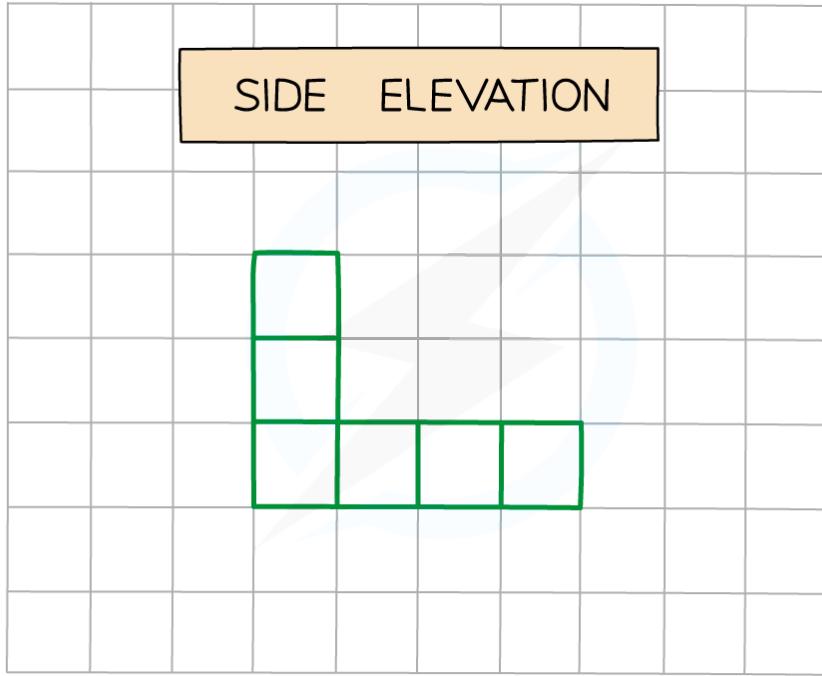


As you draw each of three views, make sure you label them clearly to say which is the plan, the front elevation and the side elevation.

Notice that two of the squares shaded orange cannot be seen from the side as they are hidden by the cubes in front of them.



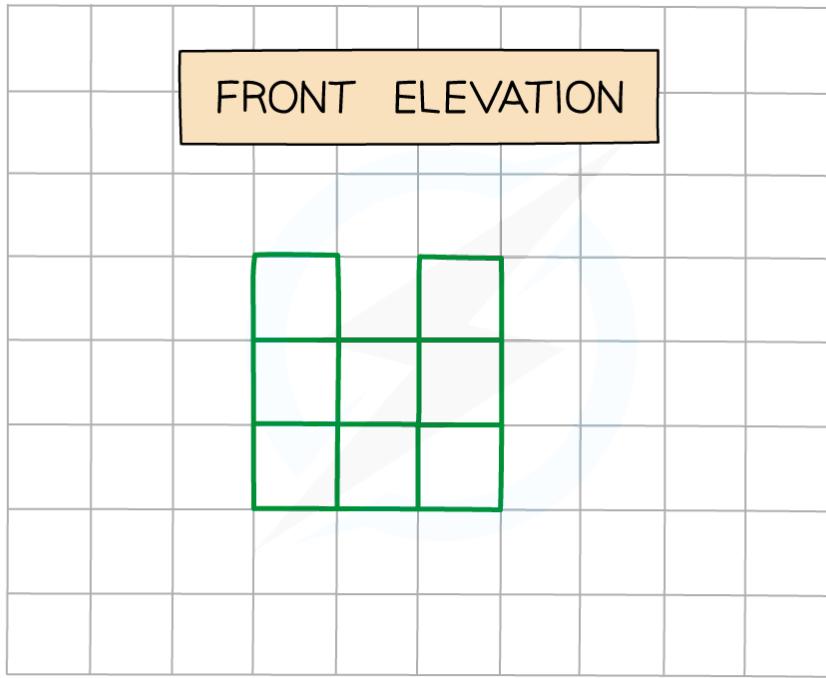
Your notes



Copyright © Save My Exams. All Rights Reserved



Your notes



Copyright © Save My Exams. All Rights Reserved