

Geometric Designs

Geometric designs are all around us. They are used in creating logos for businesses and organisations.



Example

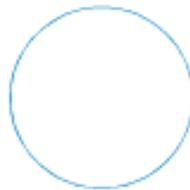
Olivia works for a design company. When she produces a design for a logo, she does a sketch first. At other times Olivia writes down a description of the design and other people are responsible for drawing it. This can be done by hand or using a computer design program.

Olivia's design for a logo is described as follows:

The logo is a circle overlaid by an equilateral triangle. The vertices are outside the circle and the segments between the triangle and circle are shaded.

Solution

Draw the circle first.



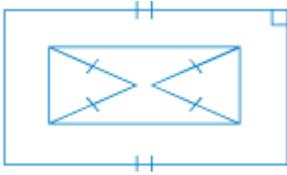
Add the equilateral triangle – a triangle where all sides are equal in length – and shade.



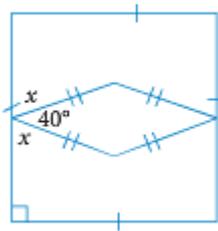
Exercise 1

Copy these designs accurately. You can do this with a ruler and protractor.

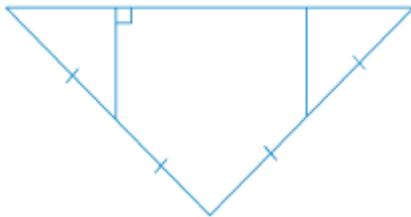
Q1. In the large rectangle, the length is twice the width and in the small rectangle, the width is half the width of the large rectangle.



Q2.



Q3.



Q4. Use the following words to complete the description of the logo.

circle

circumference

diameter

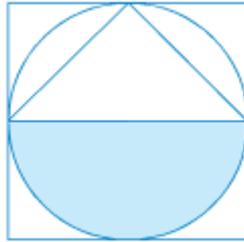
four

isosceles

semicircle

square

vertex



The perimeter of the logo is a square. Inside the _____ there is a large circle whose _____ touches each of the _____ sides of the square.

The lower _____ is coloured grey. There is an _____ triangle in the top semicircle.

The vertices of the triangle are on either ends of the _____ and the third _____ is on the circumference of the _____.

Q5. Read the following descriptions of some logos, and then draw each logo.

a) The vertices of an equilateral triangle are on the circumference of a circle. The segments between the triangle and the circle are shaded.

b) The four vertices of a square are on the circumference of a circle. Both diagonals of the square have been drawn.

Two of the four congruent (identical) triangles have been shaded.

c) A regular hexagon has two equilateral triangles inside it.

One vertex of each triangle is at the centre of the hexagon and the triangles are opposite each other. One triangle has the letter R in it and the other has the letter M in it.

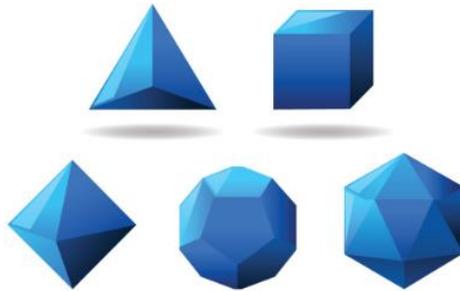
d) A rectangle contains the letters B and B, back to back.

Three-Dimensional Solids

We live in a 3D world. Everywhere around us, we see 3D solids – books, buildings, boxes.

Exercise 4

Q1. Polyhedrons



Use the word list to complete the following paragraph. You can use the words more than once.

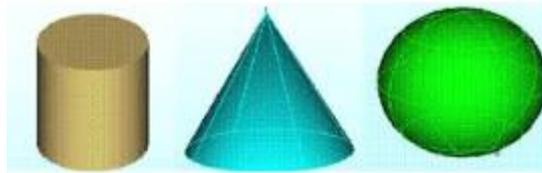
edge flat hexahedron pentahedron
prism pyramid rectangular vertex

Solids can have flat faces or curved faces. Solids that only have _____ faces are called polyhedrons. Some of the common polyhedrons are the _____ prism, the triangular _____ and the square _____ . Polyhedrons have similar names to polygons.

We call a solid with five faces a _____ .

A solid with six faces is called a _____ . When the faces of a polyhedron meet, they form an _____ . When three or more edges meet, they form a _____ .

Q2. Solids with curved surfaces:



Use the word list to complete the following paragraph. You can use the words more than once.

circle cone curved
flat rectangular sphere

Some solids are not polyhedrons because they have _____ faces.

A solid that has only one curved face is the _____. The cylinder has two _____ faces and one _____ face.

When we flatten the curved face, it is a _____ . A

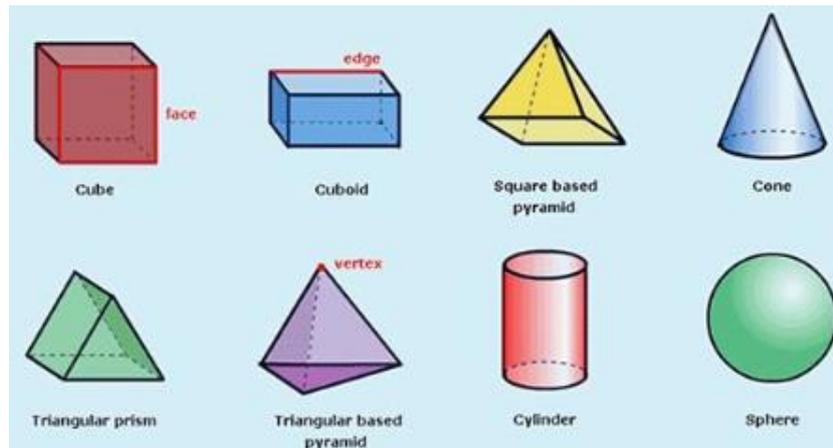
_____ has one flat face and one curved face. When we flatten the curved section it is a sector of a _____ .

Q3. Complete the table for some of the more common solids.

Solid	Number of faces	Shape of faces	Number of identical faces
Cube			
Cylinder			
Square pyramid			
Triangular prism			
Rectangular prism			
Cone			
Triangular pyramid			

Q4. Prisms and Pyramids

Use the word list below to complete the following paragraph on the next page. You can use the words more than once.



bottom cross-sectional pointed rectangle
square triangle shape

Prisms and pyramids are special types of polyhedrons. A prism has the same _____ shape from end to the other.

Both ends are the same _____. Prisms take their names from the shape at each end.

A rectangular prism has a _____ at each end and a triangular prism has a _____ at each end.

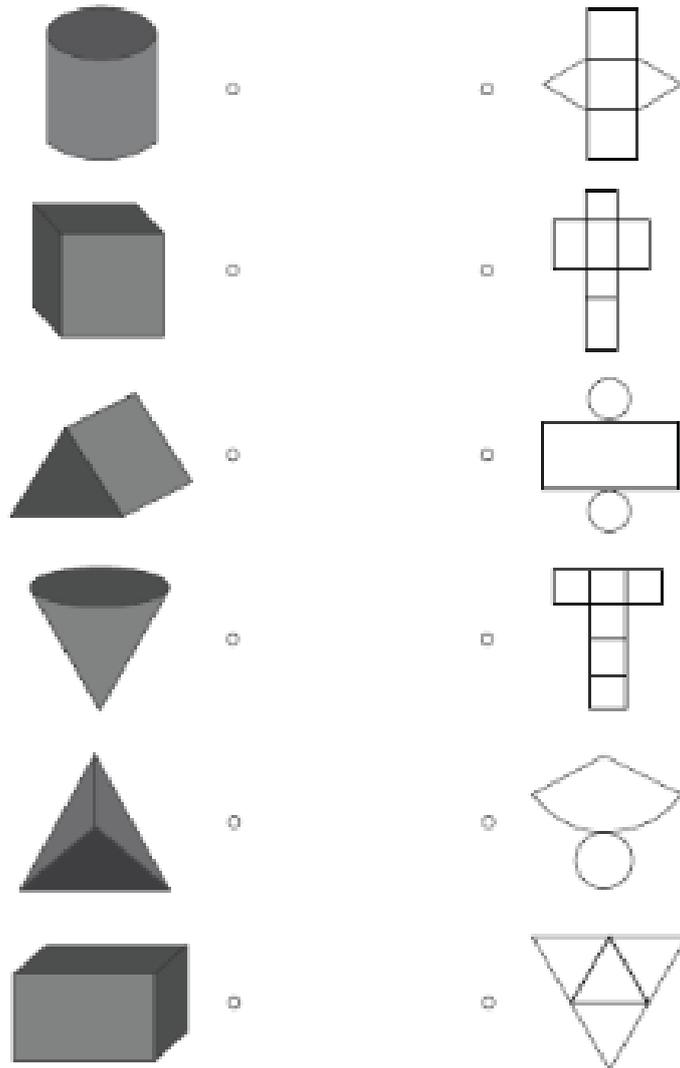
A pyramid has a _____ top, called the apex.

The shape at the _____ of the pyramid gives the pyramid its name. A square pyramid has a _____ at the bottom.

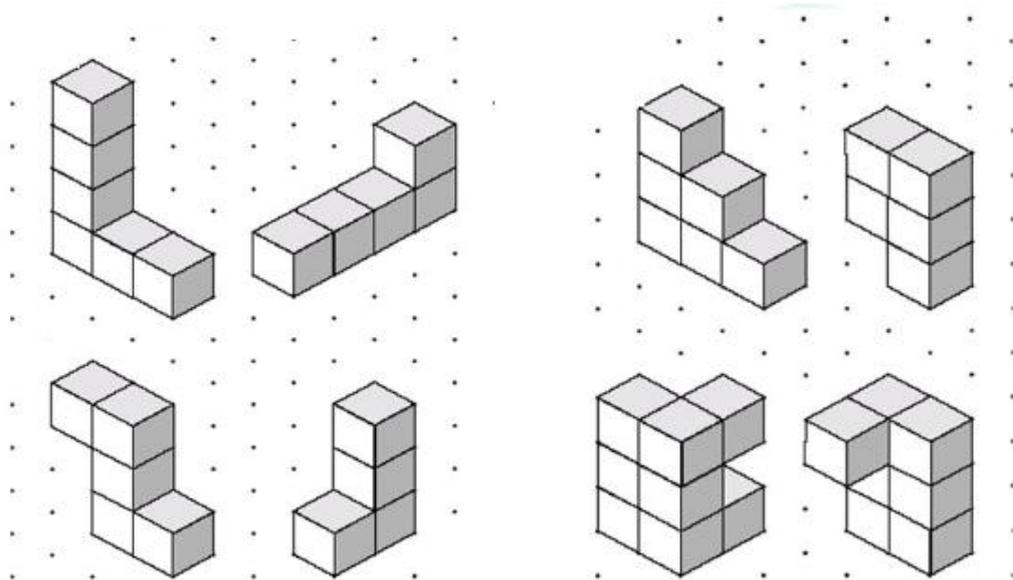
Drawing Solids

Exercise 5

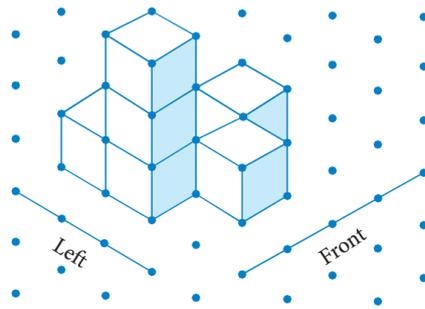
Q1. Join each shape to the matching net.



Q2. Draw the following 3D shapes on the isometric paper provided.



Q3. For the following shape draw the front view, left view and top view.



a) Front view

b) Left view

c) Top view

EM3 Week 7 Investigation

Road signs in Australia take on several geometric shapes.

Use the Internet to find 4 different shapes used in road signs.

Make a neat sketch of each one and state (marks for neatness!)

- (i) the regulation shown by the sign and
- (ii) the name of its geometric shape.