Shapes

Geometry is all about **shapes** and their properties:

1) **Plane Geometry** is about flat shapes like lines, circles and triangles ... shapes that can be drawn on a piece of paper.

2) **Solid Geometry** is about three dimensional objects like cubes, prisms, cylinders and spheres.

2D SHAPES

a) Regular Polygons: A polygon is a plane (2D) shape with straight sides. To be a regular polygon all the sides and angles must be the same:

b) Irregular Polygons: Quadrilateral just means "four sides" (quad means four, lateral means side).
Any four-sided shape is a Quadrilateral, but the sides have to be straight, and it has to be 2-dimensional.
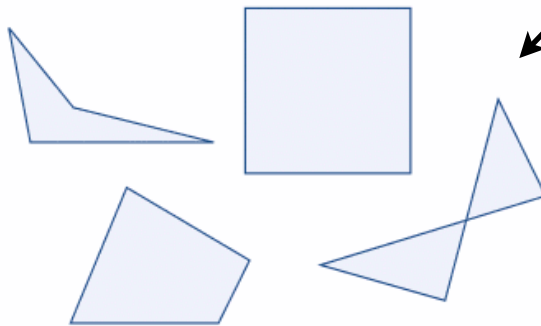
c) Curved Polygons: Circles or ovals

Point, Line, Plane and Solid
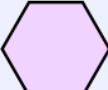
A Point has no dimensions, only position

A Line is one-dimensional

A Plane is two dimensional (2D)

A Solid is three-dimensional (3D)

Triangle - 3 Sides   Square - 4 Sides

Pentagon - 5 Sides   Hexagon - 6 sides

Heptagon - 7 Sides   Octagon - 8 Sides

Nonagon - 9 Sides   Decagon - 10 Sides

Type	Name when Regular	Sides (n)	Shape	Interior Angle	Radius	Side	Apothem	Area
Triangle (or Trigon)	Equilateral Triangle	3		60°	1	1.732 ($\sqrt{3}$)	0.5	1.299 ($\frac{3}{4}\sqrt{3}$)
Quadrilateral (or Tetragon)	Square	4		90°	1	1.414 ($\sqrt{2}$)	0.707 ($1/\sqrt{2}$)	2
Pentagon	Regular Pentagon	5		108°	1	1.176	0.809	2.378
Hexagon	Regular Hexagon	6		120°	1	1	0.866 ($\frac{1}{2}\sqrt{3}$)	2.598 ($(3/2)\sqrt{3}$)
Heptagon (or Septagon)	Regular Heptagon	7		128.571°	1	0.868	0.901	2.736
Octagon	Regular Octagon	8		135°	1	0.765	0.924	2.828 ($2\sqrt{2}$)
...	...							
Pentacontagon	Regular Pentacontagon	50		172.8°	1	0.126	0.998	3.133

(Note: values correct to 3 decimal places only)

3D SHAPES

a) Polyhedra: Must have flat faces.

i) *Platonic Solids* - a 3D shape where each face is the same regular polygon the same number of polygons meet at each vertex (corner)
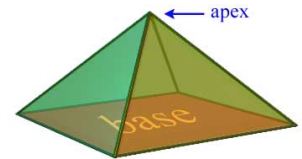
ii) *Cubes and Cuboids* - a 3D six-sided shape, also known as a hexahedron. Each face is the same size.
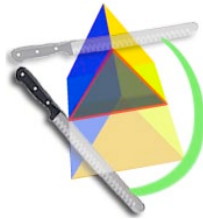
Example: the Cube is a Platonic Solid

- each face is the same-sized square
- 3 squares meet at each corner

iii) *Pyramids* - a 3D shape made by connecting a base to an apex.

apex

base

iv) *Prisms* - A cross section is the shape you get when cutting straight across an object.

The cross section of this object is a **triangle** ...

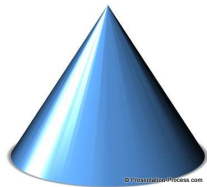.. it has the same cross section all along its length ...

... and so it's a **triangular prism.**

e) Non-polyhedra: If any surface is not flat.

i) *Sphere*

ii) *Cone*

iii) *Cylinder*