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

<table>
<thead>
<tr>
<th>Type</th>
<th>Name when Regular</th>
<th>Sides (n)</th>
<th>Shape</th>
<th>Interior Angle</th>
<th>Radius</th>
<th>Side</th>
<th>Apothem</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Triangle</strong></td>
<td><strong>Equilateral Triangle</strong></td>
<td>3</td>
<td>△</td>
<td>60°</td>
<td>1.732 (\sqrt{3})</td>
<td>0.5</td>
<td>1.299 (\frac{1}{2} \sqrt{3})</td>
<td></td>
</tr>
<tr>
<td><strong>Quadrilateral</strong></td>
<td><strong>Square</strong></td>
<td>4</td>
<td>□</td>
<td>90°</td>
<td>1.414 (\sqrt{2})</td>
<td>0.707 (1/\sqrt{2})</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Pentagon</strong></td>
<td><strong>Regular Pentagon</strong></td>
<td>5</td>
<td>✠</td>
<td>108°</td>
<td>1.176</td>
<td>0.809</td>
<td>2.378</td>
<td></td>
</tr>
<tr>
<td><strong>Hexagon</strong></td>
<td><strong>Regular Hexagon</strong></td>
<td>6</td>
<td>✡</td>
<td>120°</td>
<td>1</td>
<td>0.866 (\frac{1}{2} \sqrt{3})</td>
<td>2.598 (\frac{1}{2} \sqrt{3})</td>
<td></td>
</tr>
<tr>
<td><strong>Heptagon</strong></td>
<td><strong>Regular Heptagon</strong></td>
<td>7</td>
<td>✩</td>
<td>128.571°</td>
<td>1</td>
<td>0.868</td>
<td>0.901</td>
<td>2.736</td>
</tr>
<tr>
<td><strong>Octagon</strong></td>
<td><strong>Regular Octagon</strong></td>
<td>8</td>
<td>☩</td>
<td>135°</td>
<td>1</td>
<td>0.765</td>
<td>0.924</td>
<td>2.828 (2\sqrt{2})</td>
</tr>
<tr>
<td>...</td>
<td><strong>...</strong></td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td><strong>Pentacontagon</strong></td>
<td><strong>Regular Pentacontagon</strong></td>
<td>50</td>
<td>☪</td>
<td>172.8°</td>
<td>1</td>
<td>0.126</td>
<td>0.998</td>
<td>3.133</td>
</tr>
</tbody>
</table>

(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.

   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.

b) Non-polyhedra: If any surface is not flat.
   i) Sphere

   ii) Cone

   iii) Cylinder