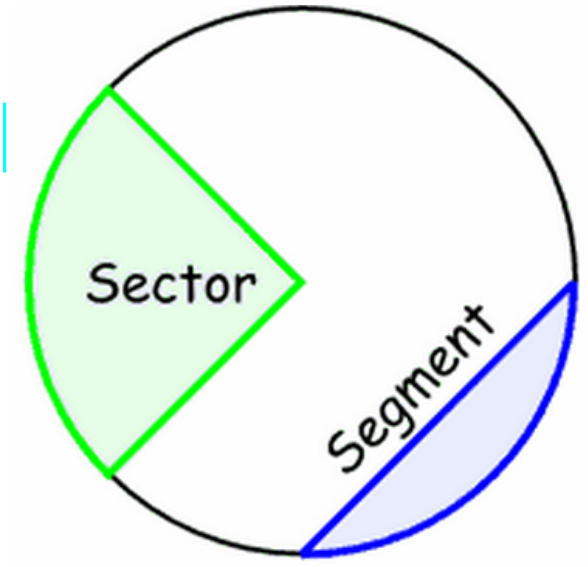
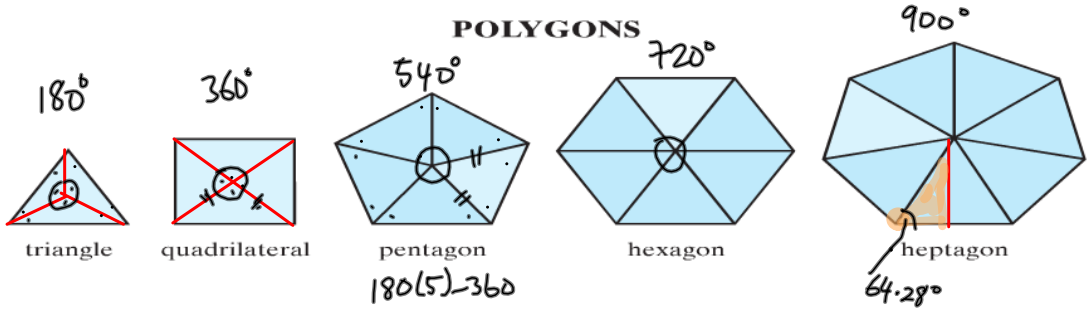




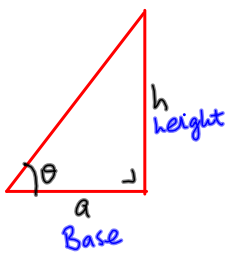
2. Polygons

A **polygon** is a plane (2-dimensional) shape with straight edges.

Regular polygons are symmetrical, with a base triangle repeated in polygons with more than 4 sides. The interior angles of regular polygons are:

Triangle = 60°, Quadrilateral = 90°, Pentagon = 108°, Hexagon = 120°, Heptagon = 128.6°

We can use the area of a right-angled triangle section to calculate the entire area of a regular polygon.



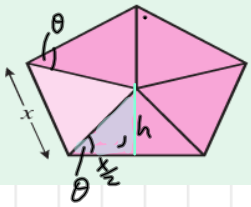
Area of triangle, $\Delta = \frac{Bh}{2}$

$\tan\theta = \frac{h}{a} \Rightarrow h = a\tan\theta$

$\Rightarrow \Delta = \frac{1}{2}a^2\tan\theta$

Example 2

The area of the regular pentagon shown here is 600 cm^2.
Calculate the length of one side, x, of the pentagon.



angles in pentagon $= 180(5) - 360 = 540°$

$\theta = \frac{540°}{10} = 54°$

area small triangle $\Delta = \frac{600}{10} = 60 \text{ cm}^2$

$B = \frac{x}{2}$ $h = ?$ $\tan 54° = h/(x/2) \Rightarrow h = \left(\frac{x}{2}\right)\tan 54°$

$\Delta = \frac{Bh}{2}$ $\Rightarrow 60 = \frac{\left(\frac{x}{2}\right)\left(\frac{x}{2}\right)\tan 54°}{2} \Rightarrow \frac{4(2)(60)}{\tan 54°} = x^2$

$\Rightarrow x^2 = 348.74 \Rightarrow x = 18.77 \text{ cm}$