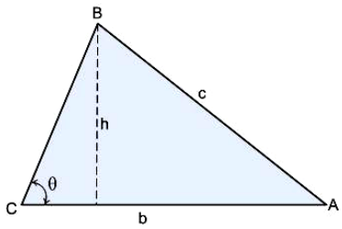
PLANE GEOMETRY

Plane geometry is all about shapes, like lines, circles and triangles that are drawn on same flat surface called plane.

TRIANGLE



When base, b and height, h is given:

$$A_T = \frac{1}{2}bh$$

When two sides, a and b and an included angle θ is given:

$$A_T = \frac{1}{2}ab\ (\sin\theta)$$

When three sides, a, b and c is given:
Hero's Formula:

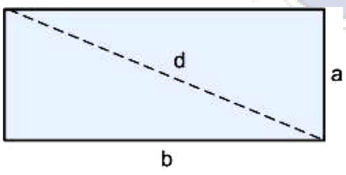
$$A_T = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a+b+c}{2}$$

When angles A, B and C and one side, a is given:

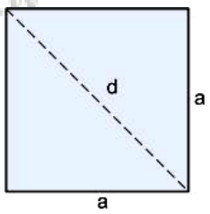
$$A_T = \frac{a^2(\sin B)(\sin C)}{2\sin A}$$

RECTANGLE



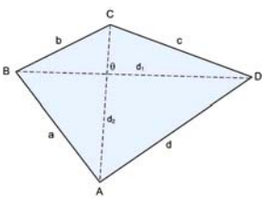
Area:	$A = ab$
Perimeter:	$P = 2(a+b)$
Diagonal:	$d = \sqrt{a^2 + b^2}$

SQUARE



Area:	$A = a^2$
Perimeter:	$P = 4a)$
Diagonal:	$d = a\sqrt{2}$

GENERAL QUADRILATERAL



When diagonal, d_1 and d_2 and included angle, θ are given:

$$A = \frac{1}{2}d_1 d_2 \sin\theta$$

When four sides, a, b, c and d and included angle, θ are given:

$$A = \sqrt{(s-a)(s-b)(s-c)(s-d) - abcd\ \cos^2\theta}$$

$$s = \frac{a+b+c+d}{2}$$

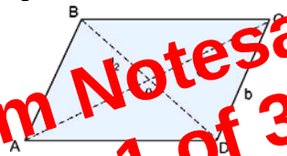
Where:

$\theta = \frac{1}{2}$(sum of two opposite angles)

When four sides, a, b, c and d and two opposite angles A and C are given:

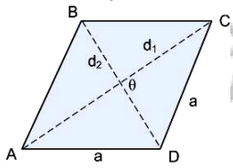
$$A = \frac{1}{2}bc\ \sin C + \frac{1}{2}ad\ \sin A$$

Parallelogram



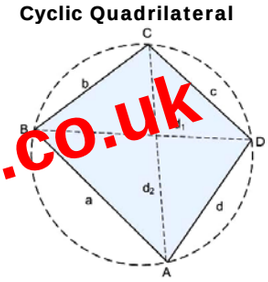
$$A = \frac{1}{2}d_1 d_2 \sin\theta$$

Rhombus, θ = 90°



$$A = \frac{1}{2}d_1 d_2$$

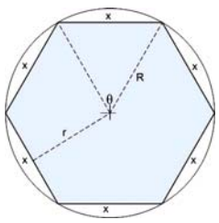
Cyclic Quadrilateral



Radius of circumscribed circle:

$$r = \frac{\sqrt{(ab+cd)(ac+bd)(ad+bc)}}{4A}$$

REGULAR POLYGONS



Equilateral polygons are polygons with equal sides
Equiangular polygons are polygons with equal interior angles
Regular polygons are polygons that are both equilateral and equiangular.

Exterior angle:	$\theta = \frac{360^o}{n}$
Area:	$A = \frac{1}{2}R^2(\sin\theta)\,n = \frac{1}{2}xr\,n$
Perimeter:	$P = (x)(n)$
Interior angles	$= \frac{n-2}{n} * 180^o$