

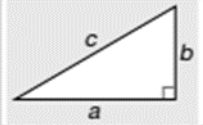
# GCSE Maths Foundation

## Formula Sheet

### Pythagoras

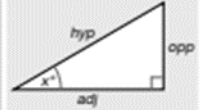
#### Pythagoras' Theorem

For a right-angled triangle,  
 $a^2 + b^2 = c^2$



#### Trigonometric ratios (new to F)

$\sin x^\circ = \frac{\text{opp}}{\text{hyp}}$ ,  $\cos x^\circ = \frac{\text{adj}}{\text{hyp}}$ ,  $\tan x^\circ = \frac{\text{opp}}{\text{adj}}$

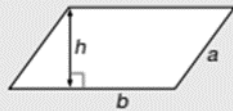


### Areas

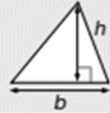
Rectangle =  $l \times w$



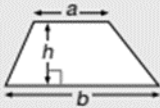
Parallelogram =  $b \times h$



Triangle =  $\frac{1}{2} b \times h$



Trapezium =  $\frac{1}{2}(a + b)h$



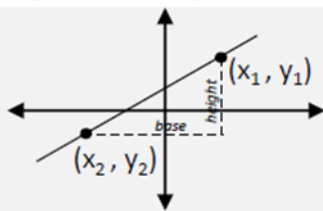
### Equations of Straight Line Graphs

Gradient:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

or

$$m = \frac{\text{height}}{\text{base}}$$



Equation of a Line  
 $y = mx + c$

Midpoint of 2 points  $(x_1, y_1)$  and  $(x_2, y_2)$

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

### Constructing Pie Charts

The angle to draw for each sector is

$$\text{Angle} = \frac{\text{frequency}}{\text{total}} \times 360^\circ$$

### Compound Growth & Decay

The amount after  $n$  years (or days, etc.) is:

$$\text{starting amount} \times \left(1 \pm \frac{r}{100}\right)^n$$

where  $r$  is the rate of change.

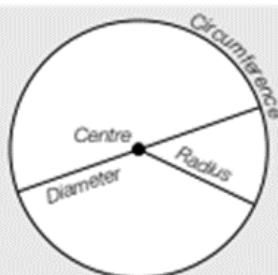
The  $\pm$  means + for growth and - for decay

### Circles

Circumference =  $\pi \times \text{diameter}$ ,  $C = \pi d$

Circumference =  $2 \times \pi \times \text{radius}$ ,  $C = 2\pi r$

Area of a circle =  $\pi \times \text{radius squared}$ ,  $A = \pi r^2$



### Compound measures

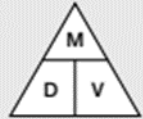
Speed

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$



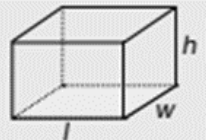
Density

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

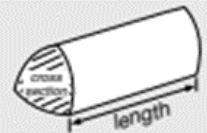


### Volumes

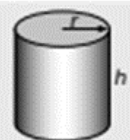
Cuboid =  $l \times w \times h$



Prism = area of cross section  $\times$  length



Cylinder =  $\pi r^2 h$



Volume of pyramid =  $\frac{1}{3} \times \text{area of base} \times h$



### Angles in Polygons

Sum of Interior Angles =  $(n - 2) \times 180^\circ$

Where  $n$  is the number of sides of the shape

Exterior Angles add up to  $360^\circ$

One exterior angle in a REGULAR polygon =  $\frac{360^\circ}{n}$

Pairs of Interior and Exterior Angles add up to  $180^\circ$