

### Compound measures

Speed

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

Density

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

Pressure

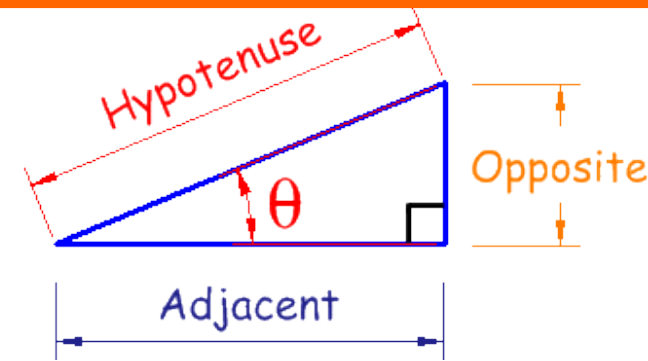
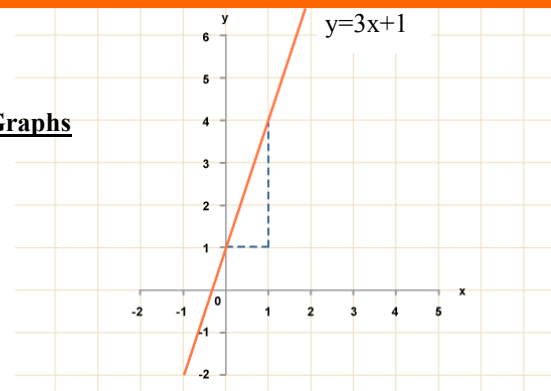
$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Gradient of the line

$$y = mx + c$$

y intercept

### Linear Graphs



### Trigonometry in Right Angled Triangles:

SOH CAH TOA

$$\sin\theta = \text{opp/hyp}$$

$$\cos\theta = \text{adj/hyp}$$

$$\tan\theta = \text{opp/adj}$$

### Special Sequences

**Prime**—numbers that have two factors, themselves and one  
1,3,5,7,11,13,17,19,23,29...

**Square**—a number multiplied by itself  
1,4,9,16,25,36,49...

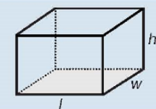
**Cube**—a number multiplied by itself twice  
1, 8, 27, 64, 125...

**Triangle**—add one more each time  
1,3,6,10,15,21,28...

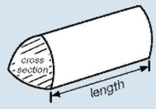
**Fibonacci**—add the two previous numbers to find the next term  
1,1,2,3,5,8,13,21...

### Volumes

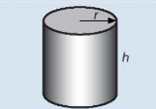
$$\text{Cuboid} = l \times w \times h$$



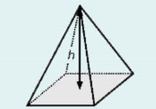
$$\text{Prism} = \text{area of cross section} \times \text{length}$$



$$\text{Cylinder} = \pi r^2 h$$



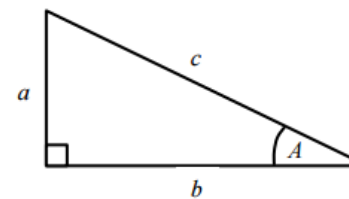
$$\text{Volume of pyramid} = \frac{1}{3} \times \text{area of base} \times h$$



### Pythagoras's theorem

In any right-angled triangle where  $a$ ,  $b$  and  $c$  are the length of the sides and  $c$  is the hypotenuse:

$$a^2 + b^2 = c^2$$



Angle ( $\theta$ )	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$
$0^\circ$	0	1	0
$30^\circ$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
$45^\circ$	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1
$60^\circ$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
$90^\circ$	1	0	undefined

## Higher Maths Facts and Formula!

### Key words:

**sum** – add the numbers together

**product** – multiply the numbers

**difference** – the gap between the numbers, biggest take away the smallest

**estimate** – round the numbers to 1sf and then work it out

**solve** – work out the value of the letter

**correlation** – the relationship between 2 variables, can be **positive**, **negative** or **no correlation**. Draw a line of best fit if correlation is positive/negative.

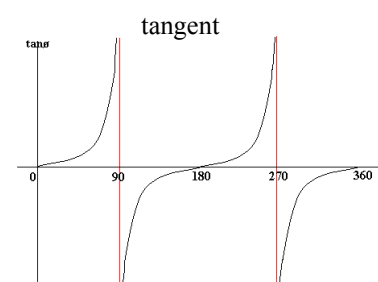
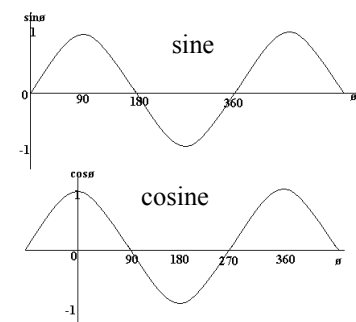
**expand** – multiply out brackets  $2(x+3)=2x+6$

**factorise** – put brackets back in  $x^2-3x = x(x-3)$

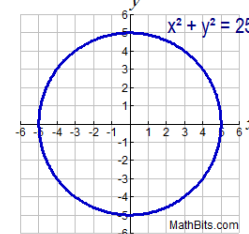
**tessellate** – fit shapes together with no gaps

**substitute** – replace the letter with the value given

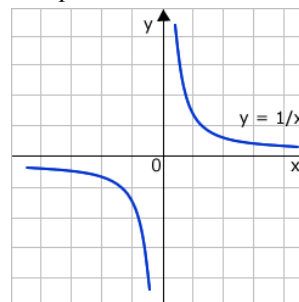
**simplify** – make it simpler by cancelling common fac-



### Graphs of circles



### reciprocal



### Equation, expression, formula, identify?

**Expression**—A collection of letters and numbers (no equals!)

**Equation**— Two expressions linked by an equals sign. These can be solved.

**Formula**—A short way of writing a rule. Like an equation but in a formula each letter means something

$$A = \pi r^2$$

A - area r - radius

**Identity**—two expressions that are always equal to each other—they are the same. We use a triple equals sign:

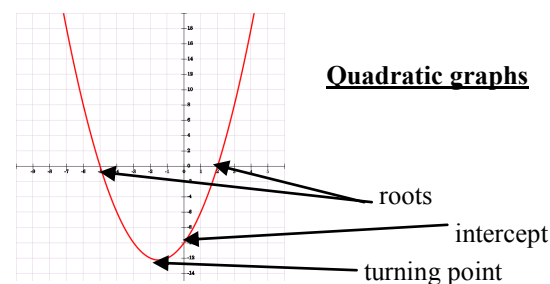
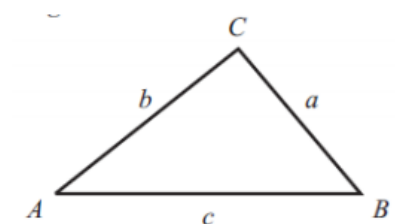
$$2(a + 3) \equiv 2a + 6$$

In any triangle ABC where  $a$ ,  $b$  and  $c$  are the length of the sides

$$\text{sine rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{cosine rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area} = \frac{1}{2} ab \sin C$$

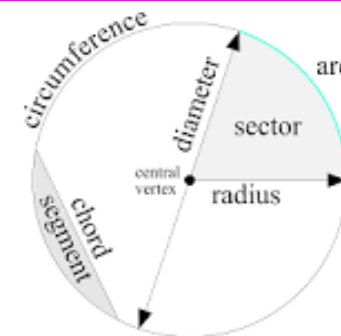


### Quadratic graphs

### The quadratic formula

The solutions of  $ax^2 + bx + c = 0$  where  $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



### Circumference and area of a circle

Where  $r$  is the radius and  $d$  is the diameter:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

$$\text{Area of a circle} = \pi r^2$$