

Year 11 – Foundation Knowledge Organiser HT1

Indices:

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$x^0 = 1$$

$$(x^a)^b = x^{ab}$$

Standard form

Any number
between 1 and
less than 10

$$A \times 10^n$$

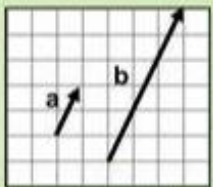
Any integer

Vectors:

$$\begin{pmatrix} a \\ b \end{pmatrix} + \begin{pmatrix} c \\ d \end{pmatrix} = \begin{pmatrix} a+c \\ b+d \end{pmatrix}$$

$\begin{pmatrix} a \\ b \end{pmatrix}$ a moves right/ left
b moves up/ down

Parallel Vectors



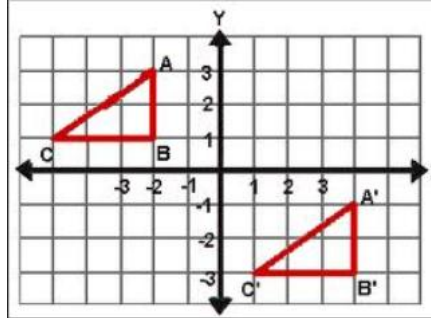
$$a = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

$$b = \begin{pmatrix} 3 \\ 6 \end{pmatrix}$$

Vectors are parallel if one is the
scalar multiple of the other.

$$a = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \times 3 \quad b = \begin{pmatrix} 3 \\ 6 \end{pmatrix}$$

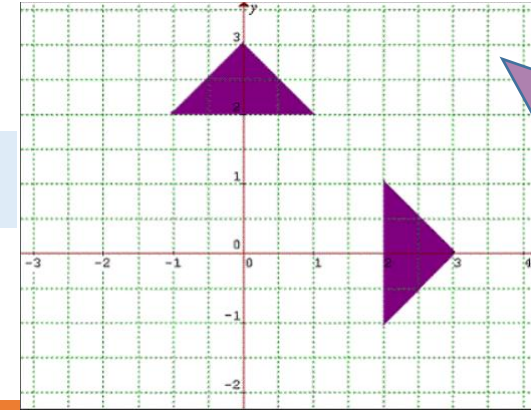
Translations



Describe with a
vector

$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ Squares right/left
Squares up/down

Rotation



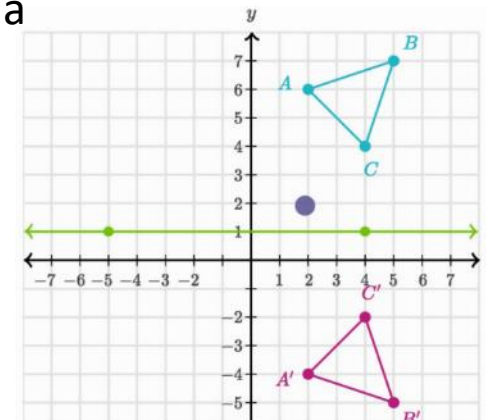
To describe a
rotation you
need:

- The angle of rotation
- The direction
- The coordinates of the centre

Reflection

Describe with a
line of
symmetry

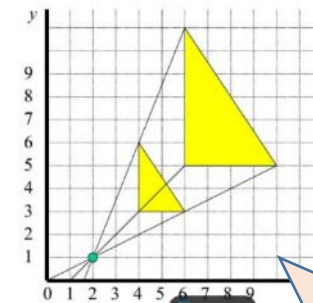
Transformations



Reflection
in the line
 $y=1$

Use tracing paper for
reflection and rotation

Enlargement

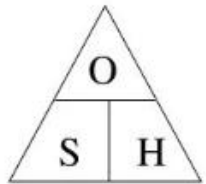
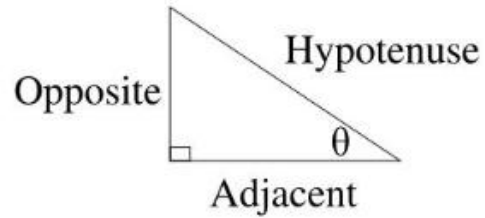


To describe an enlargement you
need:

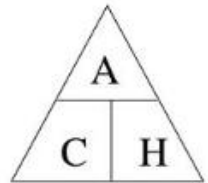
- Scale factor
- Centre of enlargement

Year 11 – Foundation Knowledge Organiser HT2

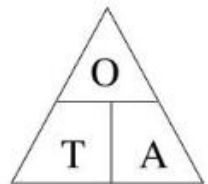
Trigonometry:



$$\sin \theta = \frac{\text{Opp}}{\text{Hyp}}$$



$$\cos \theta = \frac{\text{Adj}}{\text{Hyp}}$$

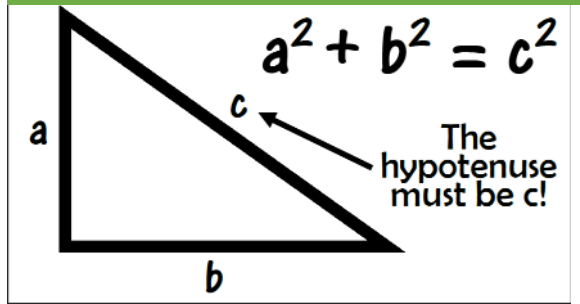


$$\tan \theta = \frac{\text{Opp}}{\text{Adj}}$$

Exact Trig:

	0°	30°	45°	60°	90°
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	Undefined

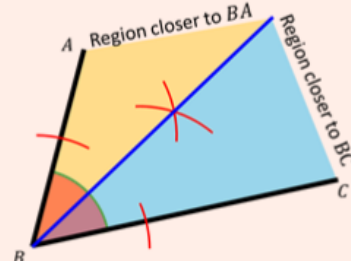
Pythagoras theorem:



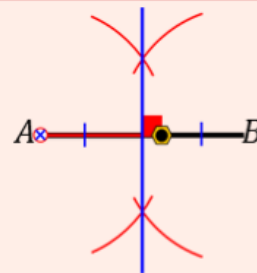
Loci:



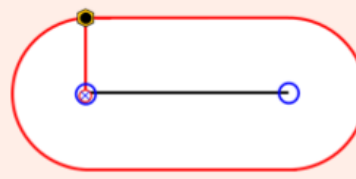
The locus of points from a point is a circle



The locus of points between two lines is the angle bisector



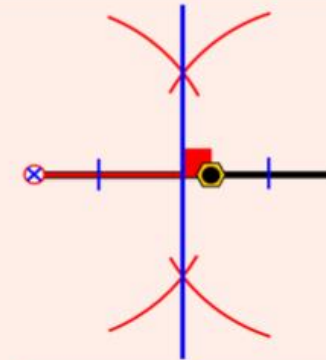
The locus of points between two points is the perpendicular bisector



Notice how the locus of points around a corner is CURVED

A locus is a series of points that satisfy a particular condition. Loci is the plural and will often involve several conditions.

Construction:

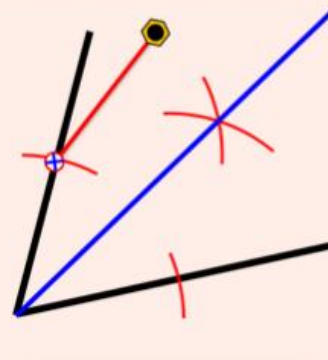


Set compass to over halfway

Create arcs above and below the line

Do not alter the compass at all!

Sometimes you will need to create a separate line segment



Mark off each line segment

Create arcs within the angle

Do not alter the compass at all!

Year 11 – Foundation Knowledge Organiser Formula and Facts

Foundation Tier Formulae Sheet

You need to learn these

Perimeter, Area and Volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

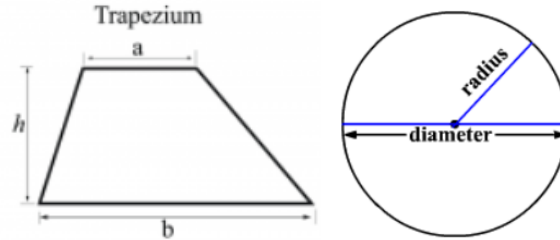
$$\text{Area of a trapezium} = \frac{1}{2}(a+b)h$$

Volume of a prism = area of cross section $\times$ length

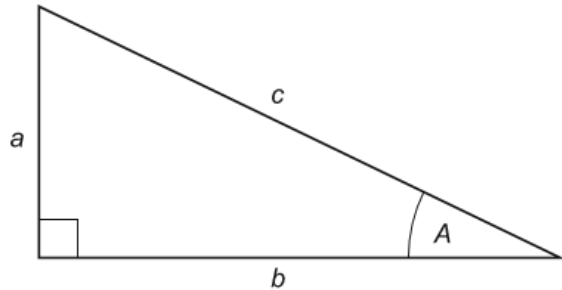
Where r is the radius and d is the diameter:

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

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



Pythagoras' Theorem and Trigonometry



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

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

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

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is the number of times that the interest is compounded:

$$\text{Total accrued} = P\left(1 + \frac{r}{100}\right)^n$$

Probability

Where $P(A)$ is the probability of outcome A and $P(B)$ is the probability of outcome B :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Laws of indices

Know and apply:

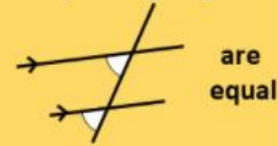
$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

Angle Facts

Corresponding Angles



Alternate Angles

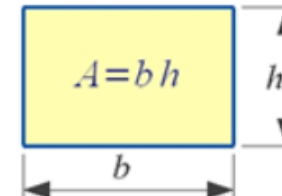


Co-Interior Angles

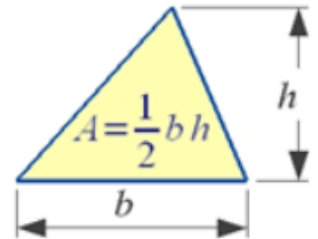


Area of 2D Shapes Formula

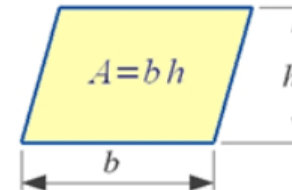
Rectangle



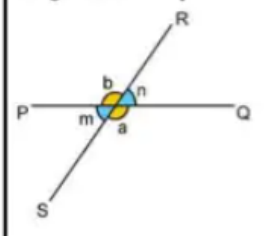
Triangle



Parallelogram



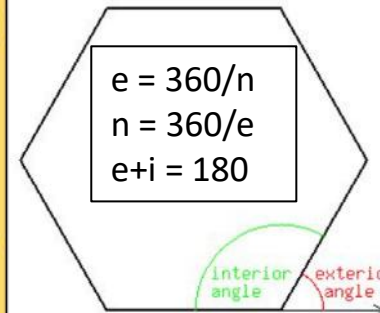
Vertically opposite angles are equal.



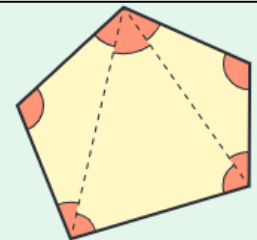
$$e = 360/n$$

$$n = 360/e$$

$$e + i = 180$$



e = exterior angle
 i = interior angle
 n = number of sides



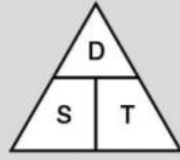
A polygon with n sides can be split into $(n - 2)$ triangles. Sum of interior angles = $180(n - 2)^\circ$

You are given this in the exam

Compound measures

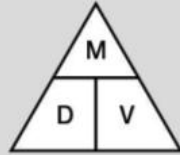
Speed

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



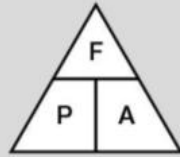
Density

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

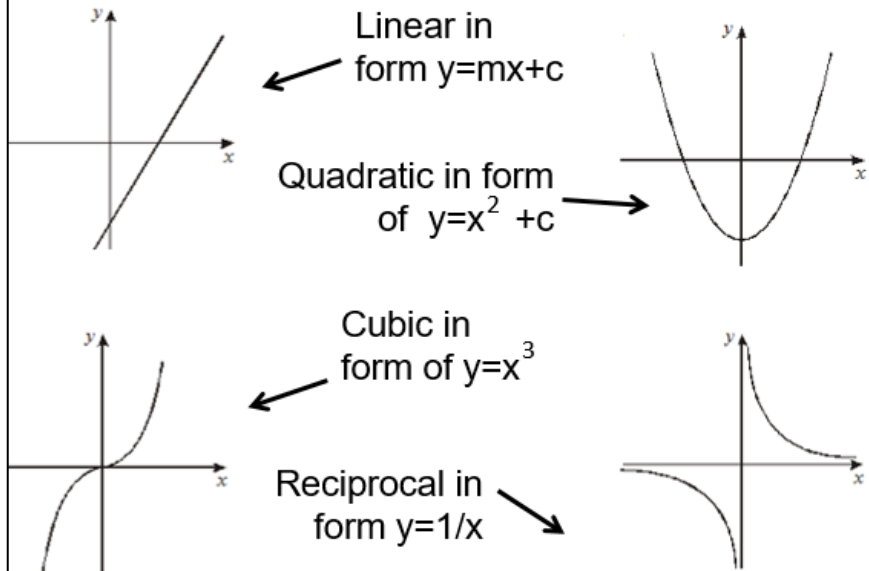


Pressure

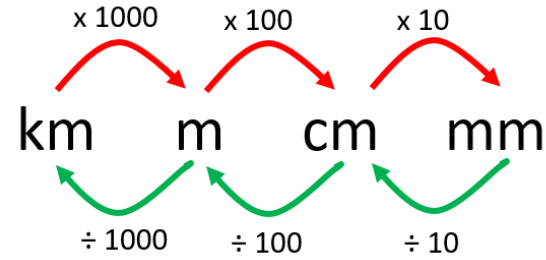
$$\text{pressure} = \frac{\text{force}}{\text{area}}$$



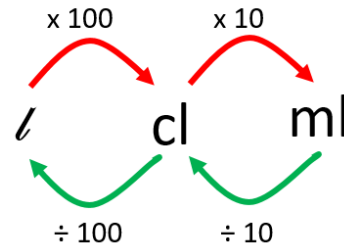
Types of Graphs



Metric Conversions - LENGTH

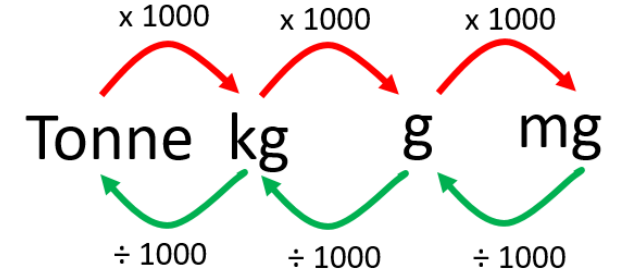


Metric Conversions - CAPACITY



$$5 \text{ miles} = 8 \text{ km}$$

Metric Conversions - MASS



Length	Mass	Capacity
1 cm = 10 mm	1 g = 1000 mg	1 cl = 10 ml
1 m = 100 cm	1 kg = 1000 g	1 cm ³ = 1 ml
1 km = 1000 m	1 tonne = 1000 kg	1 litre = 1000 ml
		1 litre = 1000 cm ³

Extras