


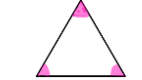
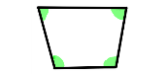
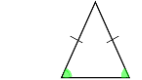

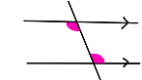

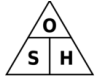
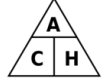



Maths Knowledge Organiser Year 11 (FOUNDATION) Cycle 2

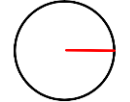
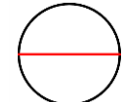

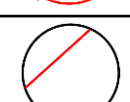

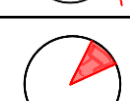
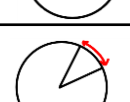
A: Angle Facts	
	Angles on a straight line add up to 180°
	Angles around a point add to 360°
	Vertically opposite angles are equal
	Angles in a triangle add up to 180°
	Angles in a quadrilateral add up to 360°
	Base angles in an isosceles triangle are equal
	Corresponding angles are equal
	Alternate angles are equal
	Co-interior angles add up to 180°

B: Transformations	
Rotation	Angle Direction Centre of rotation
Reflection	Line of symmetry
Translation	Vector
Enlargement	Scale factor Centre of enlargement

C: Trigonometry		
Hypotenuse	The longest side opposite the right angle	
Opposite	The side opposite the given angle	
Adjacent	The side between the angle and the right angle	
Function	Formula Triangle	Equation
Sin		$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$
Cos		$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$
Tan		$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

D: Equation of a straight line	
Equation	$y = mx + c$
Gradient	m
y-intercept	c
Gradient between (x_1, y_1) and (x_2, y_2)	$\frac{y_2 - y_1}{x_2 - x_1}$
Parallel lines...	...have the same gradient
Midpoint	$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

E: Angles in polygons	
Sum of interior angles	$(n - 2) \times 180$
One interior angle	$\frac{(n - 2) \times 180}{2}$
One exterior angle	$\frac{360}{n}$
Interior + exterior angle	180

F: Circles	
	radius
	diameter
	circumference
	chord
	tangent
	sector
	arc

G: Index Laws	
$a^m \times a^n$	a^{m+n}
$a^m \div a^n$	a^{m-n}
$(a^m)^n$	a^{mn}
a^{-n}	$\frac{1}{a^n}$
$a^{1/n}$	$\sqrt[n]{a}$

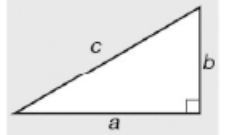
H: Number	
Square Numbers	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, ...
Cube Numbers	1, 8, 27, 64, 125, 216, 343, 512, 729, 1000...
Prime Numbers	2, 3, 5, 7, 11, 13, 17, 19, 23, 29, ...
Fibonacci	0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...

I: Averages and range	
Mean	Add up all the numbers and divide by the number of numbers
Median	Put the numbers in order and find the middle number
Mode	The most common number
Range	Biggest number – smallest number

J: Fractions, Decimals and Percentages

$\frac{1}{2}$	0.5	50%
$\frac{1}{4}$	0.25	25%
$\frac{3}{4}$	0.75	75%
$\frac{1}{10}$	0.1	10%
$\frac{1}{5}$	0.2	20%

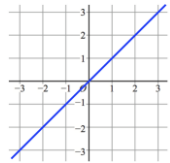
L: Pythagoras



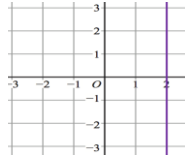
$$a^2 + b^2 = c^2$$

N: $y = x$, $y = c$ and $x = c$

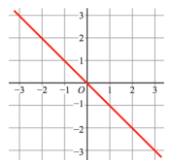
$y = x$
(x, y)
(-2, -2)
(0, 0)
(3, 3)



$x = 2$
(2, -1)
(2, 0)
(2, 3)



$y = -x$
($y, -x$)
(2, -2)
(1, -1)
(-3, 3)

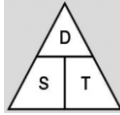


$y = -1$
(-2, -1)
(0, -1)
(3, -1)

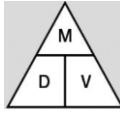


K: Compound measures

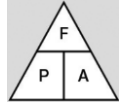
$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$



$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$



$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$



O: Conversions

km \rightarrow m	$\times 1000$
km ² \rightarrow m ²	$\times 1000^2$
km ³ \rightarrow m ³	$\times 1000^3$
m \rightarrow cm	$\times 100$
m ² \rightarrow cm ²	$\times 100^2$
m ³ \rightarrow cm ³	$\times 100^3$
cm \rightarrow mm	$\times 10$
cm ² \rightarrow mm ²	$\times 10^2$
cm ³ \rightarrow mm ³	$\times 10^3$
1 litre = ____ ml	1 l = 1 000 ml
1 litre = ____ cm ³	1 l = 1 000 cm ³
1 tonne = ____ kg	1 t = 1 000 kg
1 kilogram = ____ g	1 kg = 1 000 g
1 gram = ____ mg	1 g = 1 000 mg

P: Area

	Rectangle	$l \times w$
	Parallelogram	$b \times h$
	Triangle	$\frac{b \times h}{2}$
	Trapezium	$\frac{1}{2}(a + b)h$

P: Volumes

	Cuboid	$l \times w \times h$
	Prism	area of cross-section x length
	Cylinder	$\pi r^2 h$
	Pyramid	area of base x height

M: Recognising Graphs

	$y = x^2$
	$y = x^3$
	$y = \frac{1}{x}$

M: Circles and sectors

Diameter	radius x 2
Area of a circle	πr^2
Circumference	πd
Area of a sector	$\frac{\theta}{360} \times \pi r^2$
Arc length	$\frac{\theta}{360} \times \pi d$

Maths Knowledge Organiser

Year 11 (HIGHER) Cycle 2

A: Functions

$f^{-1}(x)$	Inverse function "Change the Subject"
$f(g(x))$	Composite Function "Substitute"

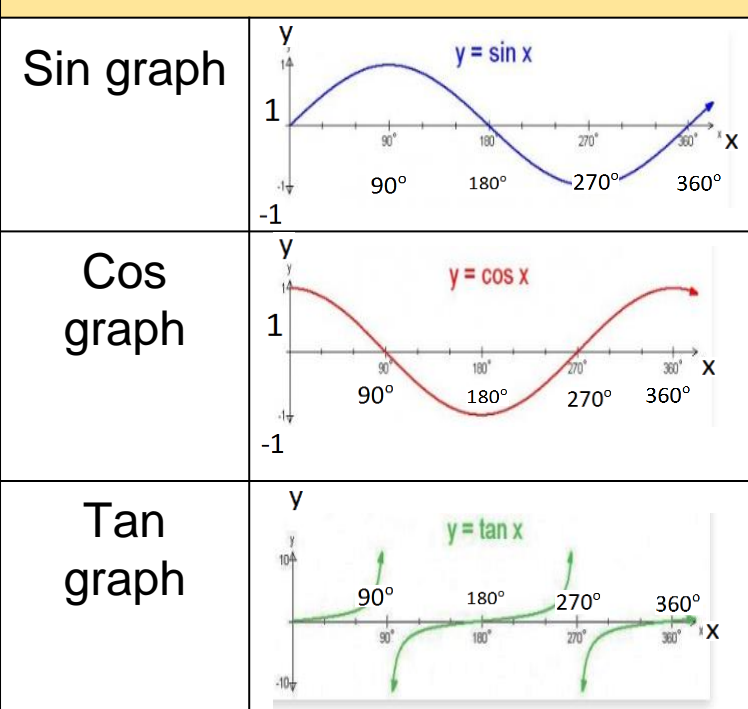
B: Further Trigonometry

Sine Rule (finding angle)	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Sine Rule (finding length)	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
Cosine rule (finding angle)	$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$
Cosine rule (finding length)	$a^2 = b^2 + c^2 - 2bccosA$
Area of a triangle	$\frac{1}{2} absinC$

C: Quadratics

Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
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D: Trigonometry Graphs



E: Exact Values

	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

F: Graph Transformations

Translation $\begin{pmatrix} a \\ 0 \end{pmatrix}$	$f(x) \rightarrow f(x - a)$
Translation $\begin{pmatrix} 0 \\ b \end{pmatrix}$	$f(x) \rightarrow f(x) + b$
Reflection in the y axis	$f(x) \rightarrow f(-x)$
Reflection in the x axis	$f(x) \rightarrow -f(x)$

G: Quadratic Inequalities (Set 1/2)

$ax^2 + bx + c < 0$, a positive	 $\alpha < x < \beta$
$ax^2 + bx + c > 0$, a positive	 $x < \alpha, x > \beta$
$ax^2 + bx + c < 0$, a negative	 $x < \alpha, x > \beta$
$ax^2 + bx + c > 0$, a negative	 $\alpha < x < \beta$
$y < f(x)$	Points below $y = f(x)$
$y > f(x)$	Points above $y = f(x)$
$<$ or $>$	Dotted line
\leq or \geq	Solid line

H: Proof (Set 1/2)

Even Number	2n
Odd Number	2n + 1
Consecutive Numbers	n, n+1, n+2
Consecutive even numbers	2n, 2n+2, 2n+4
Consecutive odd numbers	2n+1, 2n+3, 2n+5
Two different odd numbers	2n+1 and 2m+1

I: Quadratic Sequences (Set 1/2)

nth term	$an^2 + bn + c$
2 nd difference	2a
2 nd term - 1 st term	3a+b
1 st term	a+b+c

Last Maths Knowledge Organiser!

