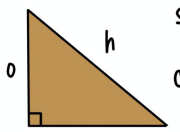
Foundation 'need to know' (not on formula sheet)

TRIGONOMETRY

SOHCAHTOA



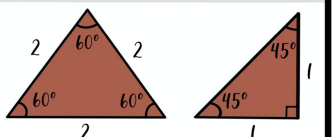
$\sin(x) = \frac{o}{h}$

$\cos(x) = \frac{a}{h}$

$\tan(x) = \frac{o}{a}$

Where h is the hypotenuse, o is the side opposite the angle and a is the adjacent side between the angle and right angle

EXACT TRIG VALUES



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

MIDPOINT OF 2 POINTS

(X_1, Y_1) AND (X_2, Y_2)

$$\left(\frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2}\right)$$

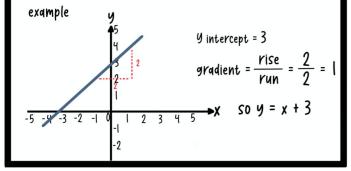
EQUATION OF LINE

$$y = mx + c$$

gradient — y intercept

$$\text{gradient} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

example

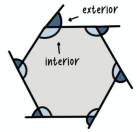


SUM OF INTERIOR ANGLES

$(n - 2) \times 180$

n is the number of sides

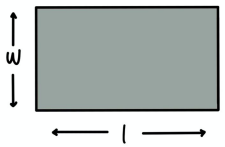
SUM OF EXTERIOR ANGLES



360°

AREA OF A RECTANGLE

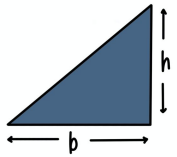
$A = l \times w$



l is the length and w is the width

AREA OF A TRIANGLE

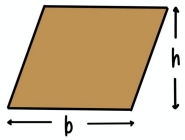
$$A = \frac{b \times h}{2}$$



b is the base and h is the perpendicular height

AREA OF A PARALLELOGRAM

$A = b \times h$



b is the base and h is the perpendicular height

CONSTRUCTING PIE CHARTS

THE ANGLE TO DRAW FOR EACH SECTOR IS

$$\text{ANGLE} = \frac{\text{FREQUENCY}}{\text{TOTAL}} \times 360°$$

LAWS OF INDICES

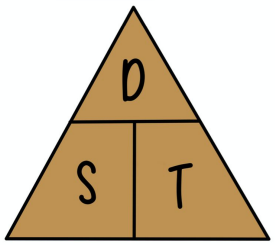
$y^a \times y^b = y^{a+b}$

$y^a \div y^b = y^{a-b}$

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

$y^0 = 1$

SPEED, DISTANCE, TIME

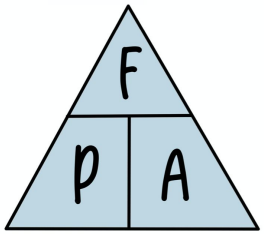


Distance = speed x time

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

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

FORCE, PRESSURE, AREA

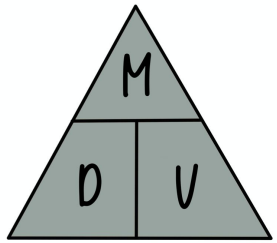


Force = pressure x area

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

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

MASS, DENSITY, VOLUME



Mass = density x volume

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

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

TRANSFORMATIONS

TRANSLATION: $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ MEANS MOVE 2-> AND 3 ↓

REFLECTION : YOU NEED THE EQUATION OF THE 'MIRROR LINE'
E.G. Y = 2

ROTATION : - COORDINATE OF THE CENTRE
- ANGLE E.G. 90°
- DIRECTION E.G. CLOCKWISE

ENLARGEMENT : SCALE FACTOR & COORDINATE OF CENTRE

Formula sheet given in exam

Foundation Tier Formulae Sheet

Perimeter, area and volume

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

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

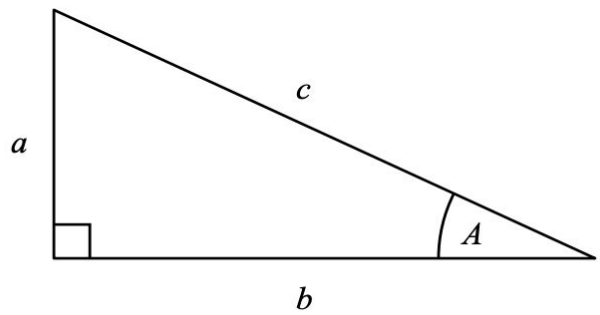
Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^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:

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

Compound Interest

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

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

Probability

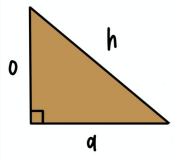
Where P (A) is the probability of outcome A and P (B) is the probability of outcome B:

P (A or B) = P (A) + P (B) – P (A and B)

Higher 'need to know' (not on formula sheet)

TRIGONOMETRY

SOHCAHTOA



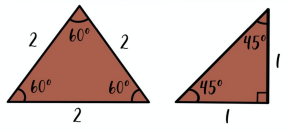
$\sin(x) = \frac{o}{h}$

$\cos(x) = \frac{a}{h}$

$\tan(x) = \frac{o}{a}$

Where h is the hypotenuse, o is the side opposite the angle and a is the adjacent side between the angle and right angle

EXACT TRIG VALUES



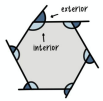
	30°	45°	60°
sin	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$
cos	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$
tan	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$

SUM OF INTERIOR ANGLES

$(n - 2) \times 180$

n is the number of sides

SUM OF EXTERIOR ANGLES



360°

LAWS OF INDICES

$y^a \times y^b = y^{a+b}$

$y^a \div y^b = y^{a-b}$

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

$y^0 = 1$

$y^{-a} = \frac{1}{y^a}$ $\quad y^{\frac{a}{b}} = \sqrt[b]{y^a}$

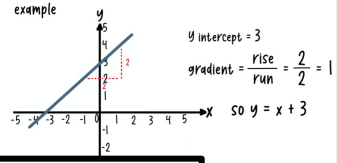
EQUATION OF LINE

$y = mx + c$

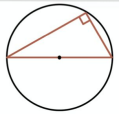
gradient — y intercept

$\text{gradient} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

example

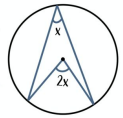


CIRCLE THEOREMS



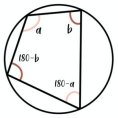
The angle in a semi-circle is 90°

The angle at the center is twice the angle at the circumference



Angles subtended by the same arc are equal

Opposite angles in a cyclic quadrilateral sum to 180°



MIDPOINT OF 2 POINTS

(X_1, Y_1) AND (X_2, Y_2)

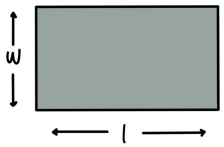
$\left(\frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2}\right)$

PERPENDICULAR GRADIENT

$-\frac{1}{M}$ WHERE M IS THE GRADIENT

AREA OF A RECTANGLE

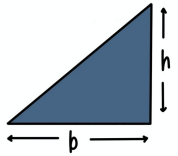
$A = l \times w$



l is the length and w is the width

AREA OF A TRIANGLE

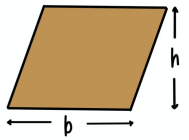
$A = \frac{b \times h}{2}$



b is the base and h is the perpendicular height

AREA OF A PARALLELOGRAM

$A = b \times h$



b is the base and h is the perpendicular height

CONSTRUCTING PIE CHARTS

THE ANGLE TO DRAW FOR EACH SECTOR IS

$\text{ANGLE} = \frac{\text{FREQUENCY}}{\text{TOTAL}} \times 360°$

SURDS

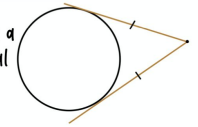
$\sqrt{a} \times \sqrt{a} = a$

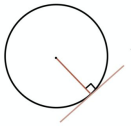
$\sqrt{a} \times \sqrt{b} = \sqrt{a \times b}$

$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$

CIRCLE THEOREMS

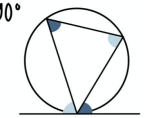
tangents from a point are equal

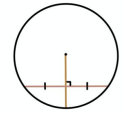




The angle between a radius and tangent is 90°

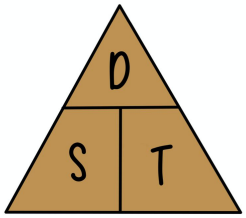
Alternate segment theory





The radius will bisect a chord at 90°

SPEED, DISTANCE, TIME

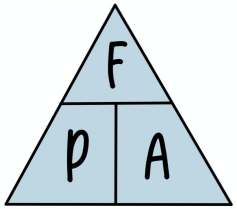


Distance = speed x time

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

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

FORCE, PRESSURE, AREA

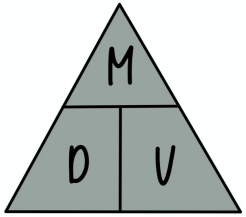


Force = pressure x area

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

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

MASS, DENSITY, VOLUME



Mass = density x volume

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

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

TRANSFORMATIONS

TRANSLATION: $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ MEANS MOVE 2-> AND 3 ↓

REFLECTION : YOU NEED THE EQUATION OF THE 'MIRROR LINE'
E.G. Y = 2

ROTATION : - COORDINATE OF THE CENTRE
- ANGLE E.G. 90°
- DIRECTION E.G. CLOCKWISE

ENLARGEMENT : SCALE FACTOR & COORDINATE OF CENTRE

Formula sheet given in exam

Higher Tier Formulae Sheet

Perimeter, area and volume

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

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

Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle $= 2\pi r = \pi d$

Area of a circle $= \pi r^2$

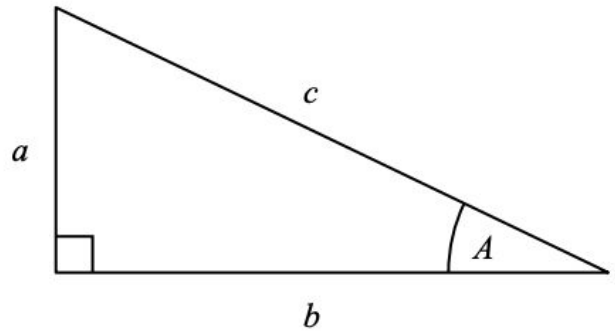
Quadratic formula

The solution of $ax^2 + bx + c = 0$

where $a \neq 0$

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

Pythagoras' Theorem and Trigonometry

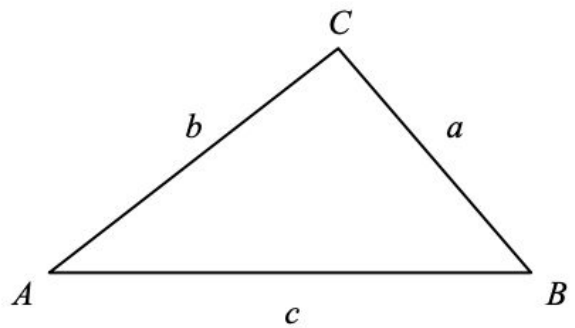


In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

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

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

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



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

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

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

Area of triangle $= \frac{1}{2}\,a\,b \sin C$

Compound Interest

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

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 or B) = P (A) + P (B) – P (A and B)

P (A and B) = P (A given B) P(B)