SIMPLE INTEREST

$$I = PRT$$

$$A = P + I$$

A = total amount ($)

P = principal ($)

R = interest rate per annum (%)
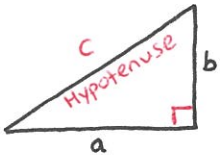
T = time in years

$$P = \frac{I}{RT}$$

$$R = \frac{I}{PT} \quad \times 100 \text{ to convert to } \%$$

$$T = \frac{I}{PR}$$

PYTHAGORAS' THEOREM
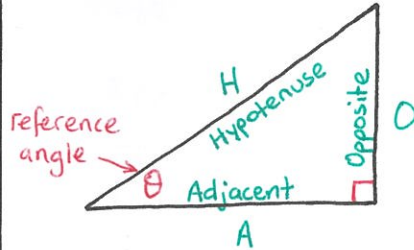

$$c^2 = a^2 + b^2 \quad \text{Officially}$$

$$c = \sqrt{a^2 + b^2} \quad \text{Finding the hypotenuse}$$

$$a = \sqrt{c^2 - b^2} \quad \text{Finding another side}$$

$$a = \sqrt{\frac{c^2}{2}} \quad \text{Isosceles triangle}$$

$$c \overset{?}{=} \sqrt{a^2 + b^2} \quad \text{Testing for right-angles}$$

TRIGONOMETRY

$$\sin\theta = \frac{O}{H}$$

$$\cos\theta = \frac{A}{H}$$

$$\tan\theta = \frac{O}{A}$$

Position of unknown	What to do?	Rearrangement (example)
Top	$\times$	$x = 7 \times \sin 35$
Denominator	$\div$	$x = 17 \div \cos 71$
Angle	Inverse	$\theta = \tan^{-1}\frac{7}{17}$

EXPANDING BRACKETS

The distributive law

$$a(b+c) = ab + ac$$

Binomial expansion (FOIL rule)

$$(a+b)(c+d) = ac + ad + bc + bd$$

Difference of two squares rule

$$(a+b)(a-b) = a^2 - b^2$$

Perfect square rules

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

FACTORISATION

Difference of two squares rule

$$a^2 - b^2 = (a+b)(a-b)$$

Perfect square rules

$$a^2 + 2ab + b^2 = (a+b)^2$$

$$a^2 - 2ab + b^2 = (a-b)^2$$

The Laws of Indices

Law	Description	Formula
Multiplication of powers	When multiplying numbers with the same base, keep the base and add the indices.	$a^m \times a^n = a^{m+n}$
Division of powers	When dividing numbers with the same base, keep the base and subtract the indices.	$a^m \div a^n = a^{m-n}$
Power of a power	When raising a number in index form to a power, keep the base and multiply the indices.	$(a^m)^n = a^{m \times n}$
Expanding products	When removing brackets around a product that has been raised to a power, raise each number to that power.	$(ab)^m = a^m b^m$
Expanding quotients	When removing brackets around a quotient that has been raised to a power, raise each number to that power.	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$
The zero index	Any number raised to the power of zero is equal to 1. Note that 0^0 is undefined.	$a^0 = 1 \ (a \neq 0)$
Negative indices	A number raised to a negative power is equal to 1 divided by the same number raised to the positive power.	$a^{-m} = \frac{1}{a^m} \ (a \neq 0)$