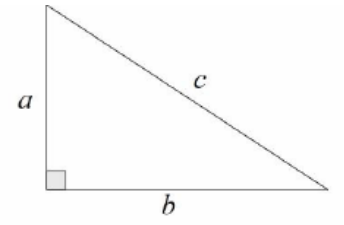
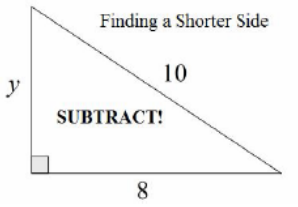
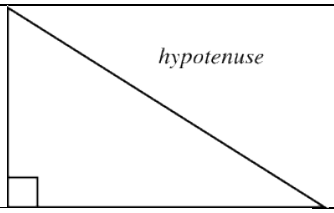
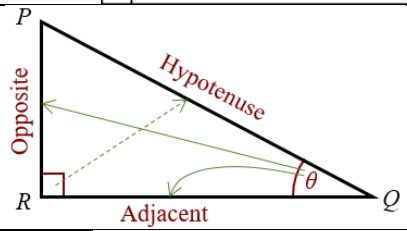
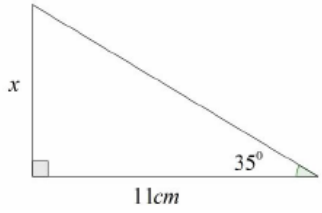
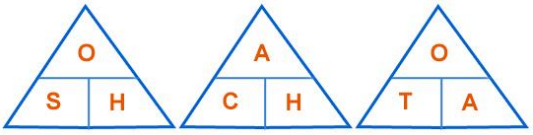
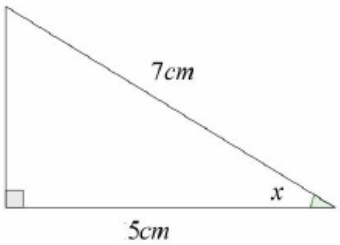
Year 9 Strand 5

Topic/Skill	Definition/Tips	Example
Pythagoras' Theorem	For any **right angled triangle**: $a^2 + b^2 = c^2$  Used to find **missing lengths**. a and b are the shorter sides, c is the **hypotenuse** (**longest side**).	 $a = y,\ b = 8,\ c = 10$ $a^2 = c^2 - b^2$ $y^2 = 100 - 64$ $y^2 = 36$ $y = 6$
3D Pythagoras' Theorem	Find missing lengths by **identifying right angled triangles**. You will often have to find a missing length you are not asked for before finding the missing length you are asked for.	Can a pencil that is 20cm long fit in a pencil tin with dimensions 12cm, 13cm and 9cm? The pencil tin is in the shape of a cuboid. Hypotenuse of the base = $\sqrt{12^2 + 13^2} = 17.7$ Diagonal of cuboid = $\sqrt{17.7^2 + 9^2} = 19.8cm$ No, the pencil cannot fit.
Trigonometry	The **study** of **triangles**.	
Hypotenuse	The **longest side** of a **right-angled triangle**. Is always **opposite** the **right angle**.	
Adjacent	**Next to**	
Trigonometric Formulae	Use **SOHCAHTOA**. $\sin\theta = \frac{O}{H}$ $\cos\theta = \frac{A}{H}$	 Use 'Opposite' and 'Adjacent', so use 'tan'

Year 9 Strand 5

	$\tan\theta = \frac{O}{A}$  When finding a missing angle, use the 'inverse' trigonometric function by pressing the 'shift' button on the calculator.	$\tan 35 = \frac{x}{11}$ $x = 11\tan 35 = 7.70cm$  Use 'Adjacent' and 'Hypotenuse', so use 'cos' $\cos x = \frac{5}{7}$ $x = cos^{-1}\left(\frac{5}{7}\right) = 44.4°$
Proof	Logical mathematical arguments used to show that a statement is true.	
Demonstration	An example which shows that either a statement can be true or that shows that a statement can't be true.	The product of two whole numbers is always an odd number. 3 x 4 = 12 We have demonstrated that this is not always true.
Odds and Evens	An **even** number is a **multiple of 2** An **odd** number is an integer which is **not a multiple of 2**.	If n is an integer (whole number): An even number can be represented by **2n** or **2m** etc. An odd number can be represented by **2n-1** or **2n+1** or **2m+1** etc.
Consecutive Integers	Whole numbers that follow each other in order.	If n is an integer: **n, n+1, n+2** etc. are consecutive integers.
Square Terms	A term that is produced by multiply another term by itself.	If n is an integer: n^2, m^2 etc. are square integers
Sum	The sum of two or more numbers is the value you get when you add them together.	The sum of 4 and 6 is 10
Product	The product of two or more numbers is the value you get when you multiply them together.	The product of 4 and 6 is 24
Multiple	To show that an expression is a **multiple** of a number, you need to show that you can **factor out the number**.	$4n^2 + 8n - 12$ is a multiple of 4 because it can be written as:

		$4(n^2 + 2n - 3)$