Maths Surds and Trigonometry Year 10 Autumn 1

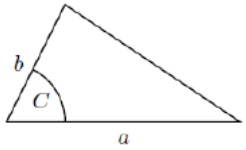
Bluecoat Wollaton
believe in yourself, in others, in God

Section 1: Key Vocabulary

Tier 3 vocabulary	Definition
Trigonometry	The mathematical study of triangles.
Ratio	A ratio compares the size of one quantity with the size of another.
Right-angled triangle	A triangle with one 90° angle.
Complementary angles	Angles which add up to 90° are said to be complementary
Hypotenuse	The longest side of a right-angled triangle.
Adjacent side	The side next to an angle in a right-angled triangle, but **not** the hypotenuse.
Opposite side	The one side not next to an angle in a right-angled triangle.
SOH CAH TOA	An acronym for remembering how to use trigonometry in right-angled triangles. S, C and T represent the trigonometric functions, Sine, Cosine, and Tangent H, A and O represent the sides of the triangle, Hypotenuse, Adjacent and Opposite

Tier 2 vocabulary	Definition
Right angle	An angle of size 90°.
Plot	Draw a detailed graph or diagram, showing all features accurately.
Sketch	Draw a rough graph or diagram, showing the important features.
Theta	A Greek letter with the symbol **θ**

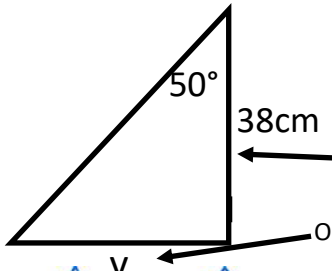
Section 2: Key Facts and Processes

How should you properly label a triangle? *There are other methods which can also be useful.*	Label the sides using lowercase letters (*a*,*b*,*c*). Label the angles using uppercase letters (*A*,*B*,*C*). Angles and sides with the same letters must be opposite each other.
The Sine Rule: used to work out the remaining sides of a triangle when two angles and a side are known or when we are given two sides and a non-enclosed angle.	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
The Cosine Rule: used to find a side from two sides and the included angle OR an angle when given the length of three sides.	$a^2 = b^2 + c^2 - 2bc\cos A$ $A = \cos^{-1}\left(\frac{b^2 + c^2 - a^2}{2bc}\right)$
What is the trigonometric formula for the area of a triangle? This picture shows what information is needed.	$\text{Area} = \frac{1}{2}ab\sin C$ 
Exact trigonometric values	

θ°	0°	30°	45°	60°	90°
Sin θ	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
Cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
Tan θ	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	*undefined*

Section 3: Support

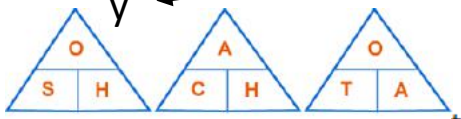
Work out the length of y to 1 decimal place.



First label the sides to see which lengths we have/are trying to find.

Adjacent (A)

Opposite (O)



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

$\tan 50 = \frac{y}{38}$

Using the formula triangles above can help us to use the correct trigonometric ratio: $y = 38 \times \tan 50 = 45.3\ (to\ 1dp)$

Cosine is the complement of Sine

Sine and Cosine values have a special relationship.

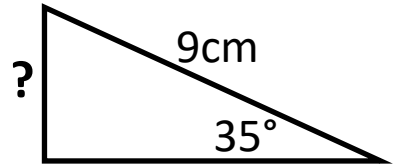
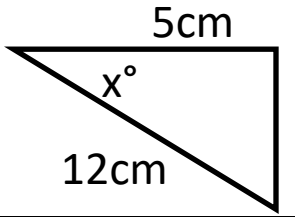
Sin θ = Cos (90—θ) so the Sine value of an angle is the same as the Cosine value of its **complementary angle.**

Access **Hegarty Maths** on a computer, tablet device or smartphone for additional support: **www.hegartymaths.com**

Select **Bluecoat Wollaton Academy** as your school.

Topic	Videos
Right-angle trigonometry	508-515
Area of a triangle using sine	516-519
The sine rule	521-525
The cosine rule	526-530
3D trigonometry	854-863
Challenge	531-533

Year 10 Maths

w/b 9th September Section 1: Vocabulary	50 children audition for a school play. 18 of the children are boys. 15 children were given a role in the play. 8 girls were given a role in the play. Can you complete a frequency tree for this information? Hegarty Maths Video Numbers: Unsure 368 Confident 369
w/b 16th September Section 2: Key Facts	There are 80 students in year 10. 9 students study French and German. 35 students only study French. 2 students do not study French nor German. Can you complete the Venn Diagram for this information? Hegarty Maths Video Numbers: Unsure 372 Confident 373
w/b 23rd September Section 3: CAF Questions	Can you work out the length of the missing side of this right angle triangle?  Hegarty Maths Video Numbers: Unsure 508 Confident 509
w/b 30th September Section 1: Vocabulary	Can you work out the missing angle on this right angle triangle?  Hegarty Maths Video Numbers: Unsure 511 Confident 512
w/b 7th October Section 2: Key Facts	What would you use the following rule for? What are you finding out? $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ Hegarty Maths Video Numbers: Unsure 520 Confident 523
w/b 14th October Section 3: CAF Questions	What is the period of the cosine function? What are the maximum and minimum values of the cosine function? Hegarty Maths Video Numbers: Unsure 304 Confident 306