How to answer Exam Questions

Step-by-step guide to answering exam questions on these key topics:

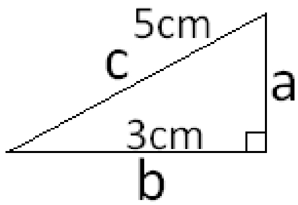
Pythagoras

Right-angled Trigonometry

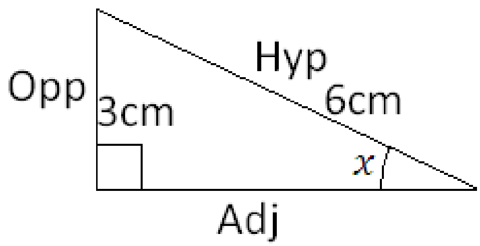
Non-right-angled Trigonometry

Simultaneous Equations

How to answer Pythagoras questions

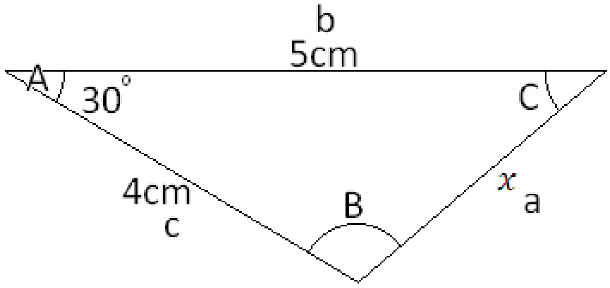
Step 1:	Write out Pythagoras' Theorem.	$a^2 + b^2 = c^2$
Step 2:	Identify the **Hypotenuse**. This is the longest side of the triangle, and is always represented by **c** in the formula. Remember, **a** and **b** can be any way round as long as **c** is the longest side (always opposite the right angle).	
Step 3:	Substitute the numbers into the formula.	$a^2 + 3^2 = 5^2$
Step 4:	Rearrange and simplify the equation, then solve to find the value of the unknown side.	$a^2 + 9 = 25$ $a^2 = 16$ $a = 4$
Step 5:	Remember to round your answer if the question asks you to, and include units.	$a = 4cm$

How to answer Right-angled Trigonometry questions

Step 1:	Label the sides of the triangle with **Hyp**, **Opp** and **Adj**. These stand for: **hypotenuse** (longest side, always opposite the right angle), **opposite** (opposite the angle we are interested in) and **adjacent** (next to ('adjacent to') the angle we are interested in)	
Step 2:	Work out which trigonometric formula you need to use. This is decided by which of the two sides you are interested in.	$\boldsymbol{\sin x = \frac{Opp}{Hyp}}$ $\cos x = \frac{Adj}{Hyp}$ $\tan x = \frac{Opp}{Adj}$
Step 3:	Substitute in the numbers you know.	$\sin x = \frac{3}{6}$
Step 4:	Rearrange (if necessary) and solve. Remember, the opposite of sin is sin^{-1}. It's usually found above the sin button on your calculator, activated by pressing $shift$.	$\sin x = 0.5$ $x = \sin^{-1} 0.5$ $x = 30$
Step 5:	Remember to round your answer if the question asks you to, and include units.	$x = 30°$

How to answer Non-right-angled Trigonometry questions

<table>
<tr><td>Step 1:</td><td>Label your triangle. Use lower case a, b and c for the sides (any order), and upper case A, B and C for the angles, so that angle A is opposite side a, etc.</td><td>



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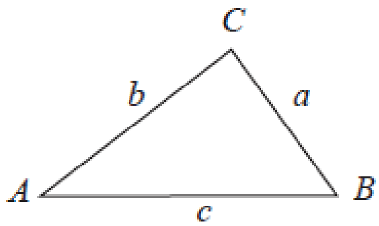
<tr><td>Step 2:</td><td>Decide which rule to use (all given in the front of your exam).
Sine Rule is for when you know the length of a side and the opposite angle (eg b and B).
Cosine Rule is for when you don’t (eg, you have all 3 sides but no angles, or you have 2 sides and the angle in between).
Area of a triangle can calculate the area of any triangle as long as you know two sides and the angle in between.</td><td>

In any triangle ABC



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 $= \frac{1}{2}ab\sin C$

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<tr><td>Step 3:</td><td>Substitute your values into the formula.</td><td>

$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$x^2 = 5^2 + 4^2 - 2 \times 5 \times 4 \times \cos 30$$

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<tr><td>Step 4:</td><td>Rearrange and solve to find the unknown values.</td><td>

$$x^2 = 6.3589\ldots$$
$$x = 2.5217\ldots$$

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<tr><td>Step 5:</td><td>Remember to round your answer if the question asks you to, and include units.</td><td>

$$x = 2.52cm\ to\ 3\ s.f.$$

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How to answer Simultaneous Equations questions

Substitution Method
Note: Often the Elimination method is slightly quicker, but is trickier to understand, and doesn't work for more complicated equations.

Step 1:	Choose the simplest looking equation, and rearrange so it gives x in terms of y or y in terms of x.	$\mathbf{6x + 2y = -3}$ $2y = -3 - 6x$ $y = -1.5 - 3x$
Step 2:	Substitute this expression for x (or y, as in this example) into the other equation. Wherever you see that letter, replace it with what our first equation says it is equal to.	$\mathbf{4x - 3y = 11}$ $4x - 3(-1.5 - 3x) = 11$
Step 3:	Simplify, rearrange and solve to find one of the unknowns.	$4x + 4.5 + 9x = 11$ $13x + 4.5 = 11$ $13x = 6.5$ $\mathbf{x = 0.5}$
Step 4:	Substitute this value back into whichever equation looks simplest (the one you made from the first equation is usually best).	$y = -1.5 - 3x$ $y = -1.5 - 3 \times 0.5$ $y = -1.5 - 1.5$ $\mathbf{y = -3}$
Step 5:	Check that your solutions work in the original equations, and then write them as your final answer.	$\mathbf{x = 0.5} \quad \mathbf{y = -3}$

Note: if one of your equations is a quadratic, step 3 will take more work, as you will need to solve a quadratic equation.