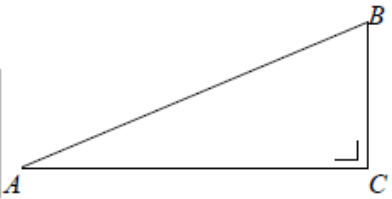
Maths
Junior Certificate
Higher Level

Past Exam Questions on PM Trigonometry

Q10 2013 Paper 2 section A

Question 10 **(Suggested maximum time: 10 minutes)**

In the triangle ABC, $|AB| = 2$ and $|BC| = 1$.



(a) Find $|AC|$, giving your answer in surd form.

(b) Write $\cos \angle BAC$ and hence find $|\angle BAC|$.

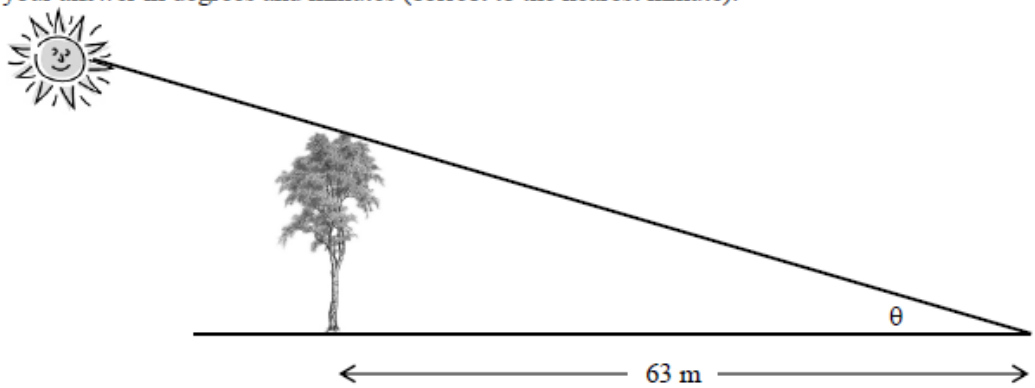
(c) Sketch a right angled isosceles triangle in which the equal sides are 1 unit each and use it to write $\cos 45°$ in surd form.

(d) Show that $\cos 75° \neq \cos 45° + \cos 30°$.

Q13 2013 Paper 2 Section A

Question 13 **(Suggested maximum time: 5 minutes)**

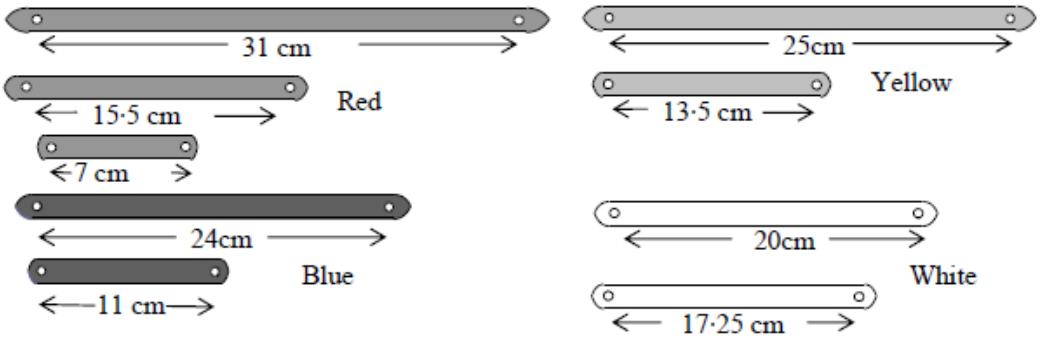
A tree 32 m high casts a shadow 63 m long. Calculate θ, the angle of elevation of the sun.
Give your answer in degrees and minutes (correct to the nearest minute).



Q8 2012 Paper 2 Sample Paper

Question 8 **(Suggested maximum time: 10 minutes)**

Monica has a set of nine coloured plastic strips (long red, middle red, short red, etc.) as shown below. The strips can be joined together by pins through small holes at their ends.



(a) Is it possible to make an isosceles triangle using any three of the nine strips? _____
Explain your answer.

(b) Monica would like to join four strips together to form a parallelogram. Explain why it is not possible to do this.

(c) The long yellow, long blue and short red strips are used to form a triangle. Monica thinks that this might be a right angled triangle. Investigate if she is correct.

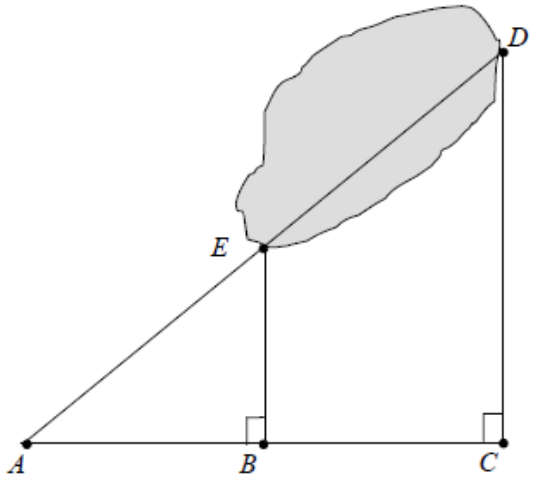
(d) Monica uses the long blue and the long white strips to form the arms of a right angle. Find the length of a strip that would be needed to complete this triangle. Give your answer correct to two places of decimals.

Q9 2012 Paper 2 Sample Paper

Question 9 **(Suggested maximum time: 5 minutes)**

A surveyor wants to calculate the distance across a lake. The lake is surrounded be woods. Three paths have been constructed to provide access to the lake from a road AC as shown in the diagram.

The lengths of the paths from the road to the lake are as follows.
$[AE] = 120$ m.
$[BE] = 80$ m.
$[CD] = 200$ m.



(a) Explain how these measurements can be used to find $|ED|$.

(b) Calculate $|ED|$, the distance across the lake.

Q15 2012 Paper 2 Sample Paper

Question 15 **(Suggested maximum time: 10 minutes)**

During a trigonometry lesson a group of students wrote down some statements about what they expected to happen when they looked at the values of trigonometric functions of some angles. They then found the sin, cos and tan of some angles, correct to three decimal places, to test their ideas. Here are some of the things they wrote down.

(i) The value from any of these trigonometric functions will **always** be less than 1.

(ii) If the size of the angle is doubled then value from the trigonometric functions will not double.

(iii) The value from all of the trigonometric functions will increase if the size of the angle is increased.

(iv) I do not need to use a calculator to find $\text{Sin}\,60°$. I can do it by drawing an equilateral triangle. The answer will be in surd form.

(a) Do you think that (i) is correct? Give an example to justify your answer.

Answer:

Example:

(b) Do you think that (ii) is correct? Give an example to justify your answer.

Answer:

Example:

(c) Do you think that (iii) is correct? Give an example to justify your answer.

Answer:

Example:

(d) Show how an equilateral triangle of side 2 cm can be used to find $\text{Sin}\,60°$ in surd form.

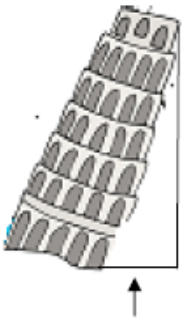
$\text{Sin}\,60° =$

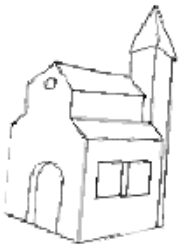
Q16 2012 Paper 2 Sample Paper

Question 16 **(Suggested maximum time: 10 minutes)**

The Leaning Tower of Pisa is 55·863 m tall and leans 3·9 m from the perpendicular, as shown below. The Suurhusen Church in north-western Germany is 27·37 m tall and leans 2·47 m from the perpendicular.

Pisa





Suurhusen

By providing diagrams and suitable calculations and explanations, decide which tower should enter the *Guinness Book of Records* as the **Most Tilted Tower in the World**.

Q11 2012 Paper 2

Question 11 **(Suggested maximum time: 5 minutes)**

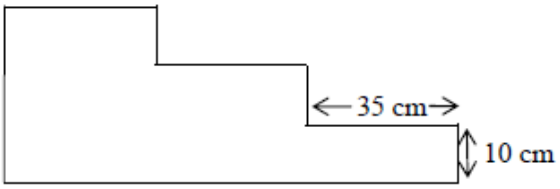
(a) Construct a right-angled triangle containing an angle A such that $\sin A = 0 \cdot 4$.

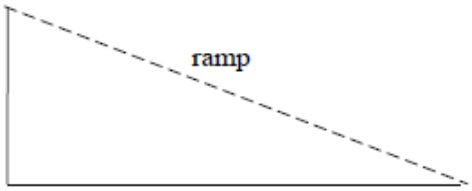
(b) Find, from your triangle, $\cos A$ in surd form.

Q12 2012 Paper 2

Question 12 **(Suggested maximum time: 5 minutes)**

A homeowner wishes to replace the three identical steps leading to her front door with a ramp. Each step is 10 cm high and 35 cm long. Find the length of the ramp. Give your answer correct to one decimal place.

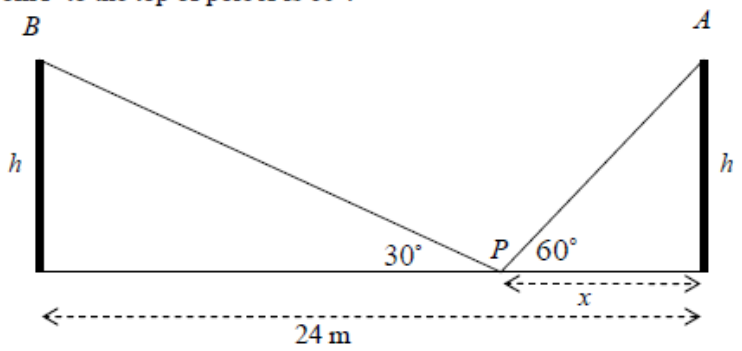




Q13 2012 Paper 2

Question 13 **(Suggested maximum time: 10 minutes)**

Two vertical poles A and B, each of height h, are standing on opposite sides of a level road. They are 24 m apart. The point P, on the road directly between the two poles, is a distance x from pole A. The angle of elevation from P to the top of pole A is 60°.



(a) Write h in terms of x.

(b) From P the angle of elevation to the top of pole B is 30°. Find h, the height of the two poles.