Lesson 10

GCSE Mathematics
Non-Right Angled Trigonometry

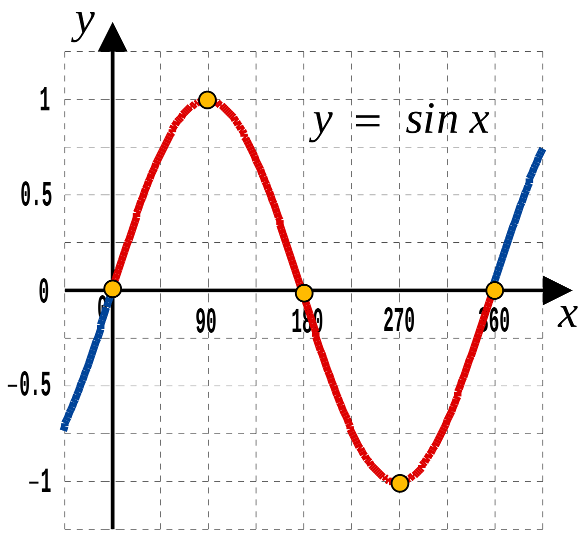
10.1 Revision for TEST

Question 1

(i) Use your calculator to find a solution to the equation;

$$y = \sin 50°$$

(ii) A section of the graph of $y = \sin x$ is shown below;



Show, by drawing on the graph, where your part **(i)** solution is.

(iii) Use your calculator to find a solution to the equation;

$$y = \sin 260°$$

(iv) Show, by drawing on the graph, where your part **(iii)** solution is.

[8 marks]

Question 2

Use your calculator to calculate in one go, the value of the following;

$$\frac{\sin 90° + \sin 45°}{\sin 90° - \sin 45°}$$

Give the answer correct to 4 decimal places.

[4 marks]

Question 3

(i) Solve the equation $A = arccos\,(-0.627)$
Give your answer to 1 decimal place.

(ii) If $cos\,B = 0.751$ what is B ?
Give your answer in degrees, to 1 decimal place.

(iii) Calculate the value of x correct to 3 significant figures;

$$x = \frac{5.8 \times sin\,76°}{sin\,13°}$$

(iv) Solve the following equation.
Give your answer correct to 3 significant figures.

$$\frac{x}{sin\,28°} = \frac{723}{sin\,51°}$$

[8 marks]

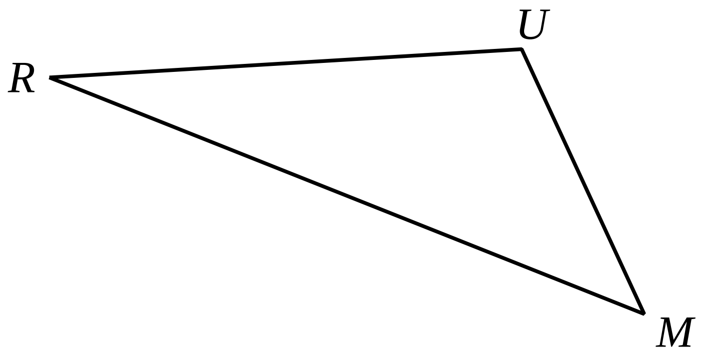
Question 4

Give a rough sketch of the graph of $y = tan\,x$ in the space below.
Your sketch should be over the interval $0° \leqslant x \leqslant 360°$

[4 marks]

Question 5

A triangle, $\triangle RUM$, is shown below.



(i) On $\triangle RUM$ place the letters r, u and m.

[1 mark]

(ii) On $\triangle RUM$ add the facts that

- $\angle R = x°$, the angle to be found.
- $RM = 31.2$ cm
- $MU = 29.4$ cm
- $\angle U = 115°$.

[1 mark]

(iii) On $\triangle RUM$ mark the two excluded angles, each with a *.

[1 mark]

(iv) Write down the 'upside down' version of the sine rule for $\triangle RUM$.

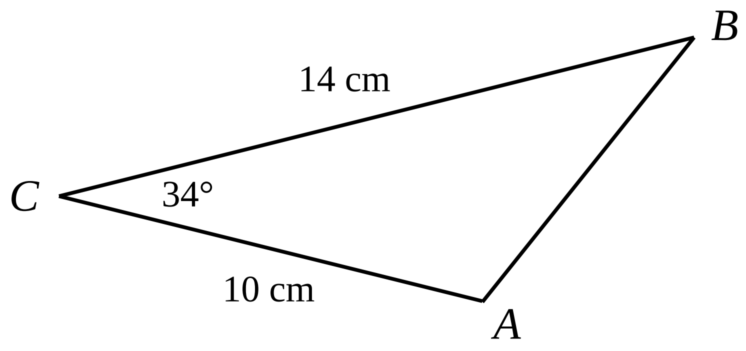
[1 mark]

(v) Find angle x, in degrees and accurate to 3 significant figures.

[5 marks]

Question 6

In $\triangle ABC$, shown below, $\angle C = 34°$ and lies between $CB = 14$ cm and $CA = 10$ cm.



(i) Use ***The Cosine Rule*** to calculate the length of side *AB*.

(ii) Use ***The Useful Area Of A Triangle Formula*** to calculate the triangle's area.

In both cases, clearly state the units of your answer.

[8 marks]

Question 7
A triangle has sides of length 12 cm, 15 cm and 18 cm.
Find the size of the angle opposite the side of length 15 cm.

[8 marks]

Question 8

In $\triangle ABC$, two of the angles are, $A = 48°$, and $C = 24°$.

Opposite the angle, B, is a side of length 17.3 cm.

(i) Use a well known fact about the sum of the angles in a triangle to determine the size of angle B.

(ii) Sketch the triangle, not to scale, and mark on all known lengths and angles.

(iii) Find the length of each missing side, stating which is BC and which is AB.

[10 marks]

Question 9

In $\triangle ELF$, $e = 8.6$ cm, $f = 18.4$ cm and $L = 72°$.

Find length l.

[8 marks]

Question 10

The area of any regular polygon is given by the formula;

$$A = \frac{n\ r^2 \sin\left(\frac{360}{n}\right)}{2}$$

where n is the number of sides,
and r is the 'radius' of the polygon, the length of a spoke from it's centre to a vertex.

(i) With r fixed at 2.5 cm, complete the following table

n	3	4	5	6	7	8	9	10	11	12
A										

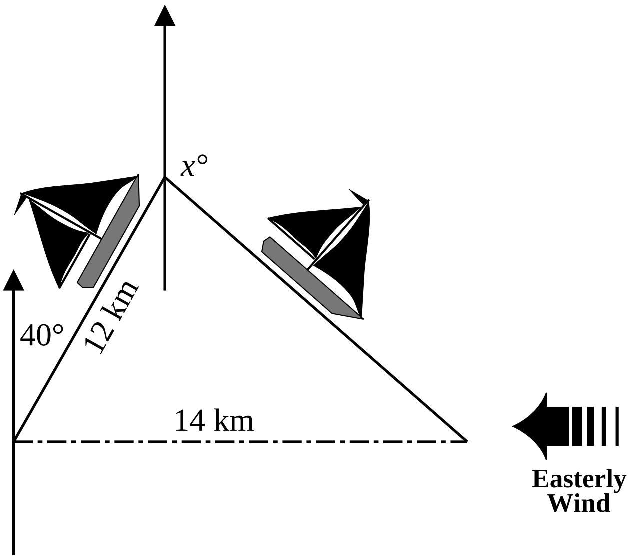
(ii) Plot a graph of your results with n in the x-axis and area A on the y-axis

(iii) What would you expect to happen to A as n continues to increase ?

[12 marks]

Question 11

In order to make progress into a due East headwind, a sailing yacht tacks 12 km on a bearing of 040° before changing tack and sailing a further distance as shown below.



It has at this point made 14 km of effective progress directly to the East.
Determine the bearing on which the yacht progressed , marked *x*°, when sailing on the second tack.

[10 marks]

Question 12

(i) For any triangle, $\triangle ABC$, explain why $\frac{1}{2}\, bc \sin A = \frac{1}{2}\, ab \sin C$

(ii) Hence prove that

$$\frac{\sin A}{a} = \frac{\sin C}{c}$$

(iii) $\triangle ABC$ has $a = 17$ cm, $c = 15$ cm and $\angle C = 54°$.
Find the acute angle, $\angle A$.

(iv) Had you been told that $\angle A$ was obtuse, what would $\angle A$ have been ?

[11 marks]