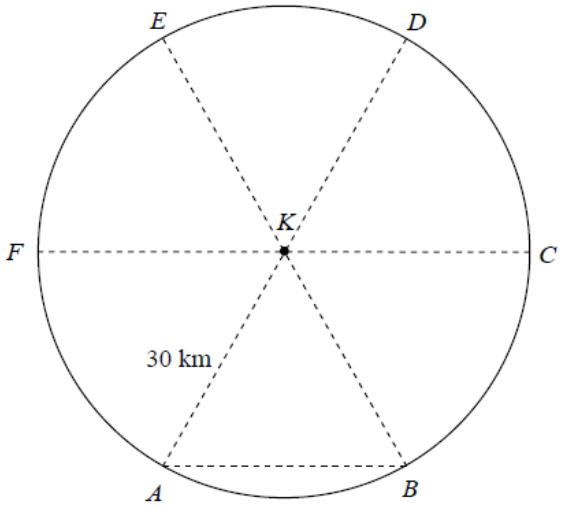
Maths
Leaving Certificate
Ordinary Level

Past Exam Questions
on
Trigonometry

Q8 2013 Project Maths Paper Two Ordinary Level Section B

Question 8 **(75 marks)**

A search is begun for a buoy that has become detached from its mooring at sea. The area to be searched is a circle of radius 30 km from the last known position, K, of the buoy. The search area is divided into six equal sectors as indicated by the letters A, B, C, D, E and F.



(a) Fishing boats search the triangular area KAB.

(i) Find $|\angle BKA|$.

Answer: _____

(ii) Find the area of the triangle KAB.

(iii) Write the area of the triangle KAB as a percentage of the area of the sector KAB.

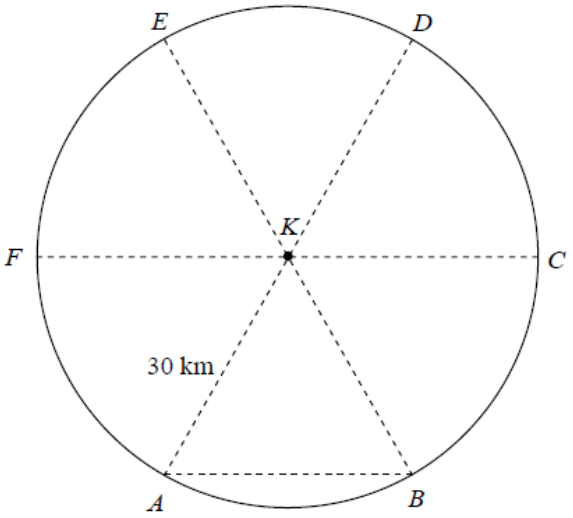
(iv) Use the cosine rule to find the length of $[AB]$.

(v) What does your answer to **(iv)** above show about the triangle KAB?

(b) A helicopter took part in the search.

(i) The helicopter flew from the point F around the perimeter of the search area. What distance did the helicopter fly, correct to the nearest km?

(ii) The helicopter then flew in a straight line from F to D and from D on to C, also in a straight line. Draw the path of the helicopter on the diagram.



(iii) A theorem on your course can be used to find $|\angle FDC|$.
Write down $|\angle FDC|$ and state the theorem.

$|\angle FDC| =$ _____

Statement of theorem:

(iv) The helicopter flew at a speed of 80 km/h. How long did it take to fly from F to D and on to C?

(c) A lifeboat taking part in the search sailed, in a straight line, from the point K until it reached a point X, the midpoint of $[ED]$.

(i) Calculate $|KX|$.

(ii) The buoy was located at the point where the path KX, of the lifeboat, crossed the path FD of the helicopter. How far was the buoy from X?

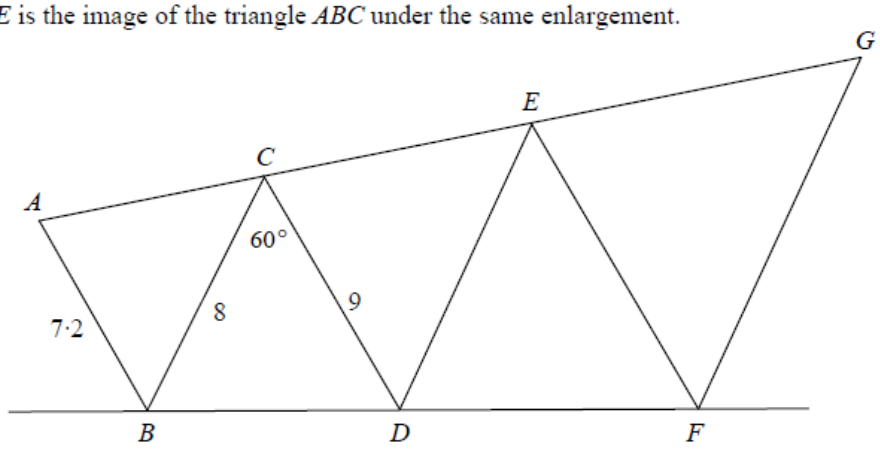
Q8 2012 Project Maths Paper Two Ordinary Level Section B

Question 8 **(75 marks)**

(a) The planned supports for the roof of a building form scalene triangles of different sizes.

(i) Explain what is meant by a **scalene triangle**.

The triangle EFG is the image of the triangle CDE under an enlargement and the triangle CDE is the image of the triangle ABC under the same enlargement.

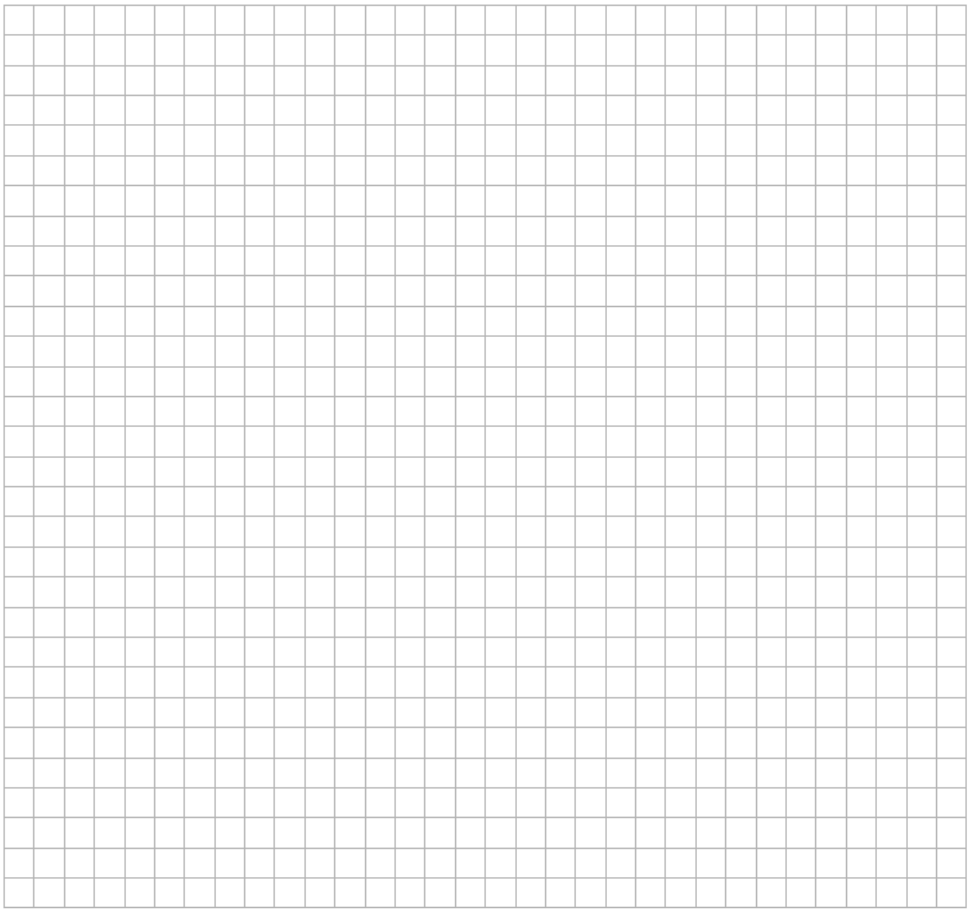


The proposed dimensions for the structure are $|AB| = 7{\cdot}2$ m, $|BC| = 8$ m, $|CD| = 9$ m and $|\angle DCB| = 60°$.

(ii) Find the length of $[FG]$.

(iii) Find the length of $[BD]$, correct to three decimal places.

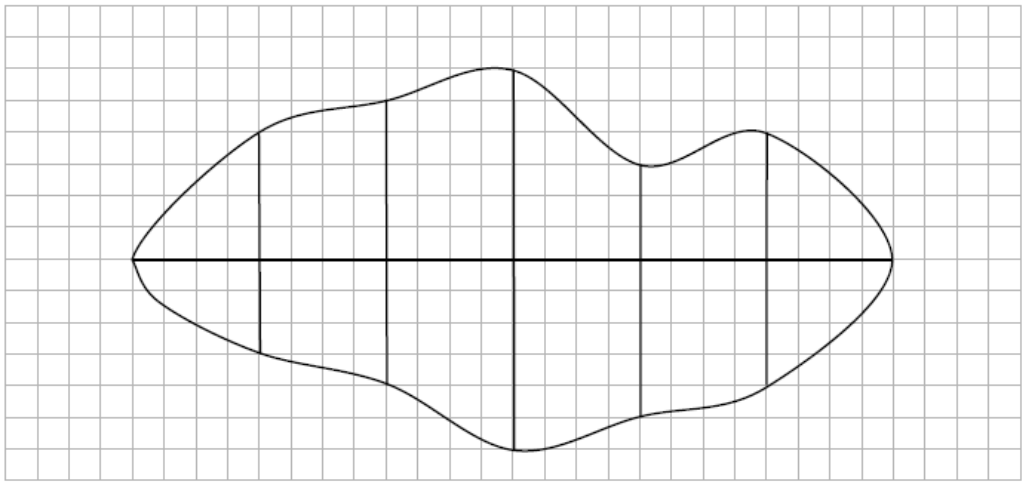
(iv) The centre of the enlargement is O. Find the distance from O to the point B.



(v) A condition of the planning is that the height of the point G above the horizontal line BF cannot exceed 11·6 m.

Does the plan meet this condition? Justify your answer by calculation.

(b) In order to estimate the area of the irregular shape shown below, a horizontal line was drawn across the widest part of the shape and five offsets (perpendicular lines) were drawn at equal intervals along this line.



(i) Find the lengths of the horizontal line and the offsets, taking each grid unit as 5 mm, and record the lengths on the diagram.

(ii) Use the trapezoidal rule to estimate the area of the shape.