Trigonometry

Maths Past Exam Questions

Higher Level

2013

Paper 2 – Project Maths – Section A Q5

Question 5 **(25 marks)**

(a) In a triangle ABC, the lengths of the sides are a, b and c. Using a formula for the area of a triangle, or otherwise, prove that

$$\frac{a}{\sin \angle A} = \frac{b}{\sin \angle B} = \frac{c}{\sin \angle C}.$$

(b) In a triangle XYZ, $|XY| = 5$ cm, $|XZ| = 3$ cm and $|\angle XYZ| = 27°$.

(i) Find the two possible values of $|\angle XZY|$. Give your answers correct to the nearest degree.

(ii) Draw a sketch of the triangle XYZ, showing the two possible positions of the point Z.

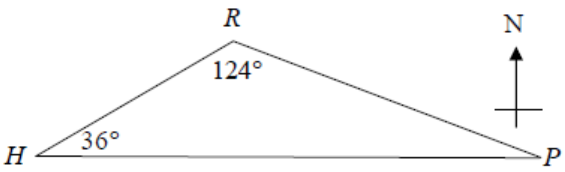
(c) In the case that $|\angle XZY| < 90°$, write down $|\angle ZXY|$, and hence find the area of the triangle XYZ, correct to the nearest integer.

$|\angle ZXY| =$

Paper 2 – Project Maths – Section B Q8

Question 8 **(30 marks)**

(a) A port P is directly east of a port H. To sail from H to P, a ship first sails 80 km, in the direction shown in the diagram, to the point R before turning through an angle of 124° and sailing 110 km directly to P.

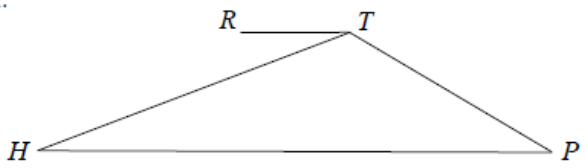


(i) Find the distance from R to HP.

(ii) Calculate $|HP|$.

(b) The point T is directly east of the point R.
$|HT| = 110$ km and $|TP| = 80$ km.

Find $|RT|$.



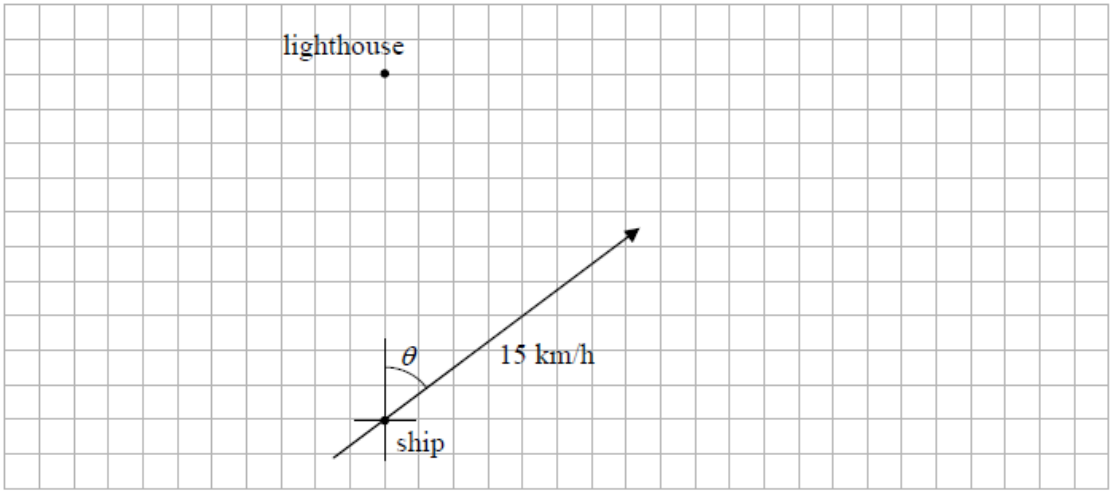
2010

Paper 2 – Project Maths – Section B Q8

Question 8 **Geometry and Trigonometry** **(50 marks)**

A ship is 10 km due South of a lighthouse at noon.

The ship is travelling at 15 km/h on a bearing of θ, as shown below, where $\theta = \tan^{-1}\left(\frac{4}{3}\right)$.



(a) On the diagram above, draw a set of co-ordinate axes that takes the lighthouse as the origin, the line East-West through the lighthouse as the x-axis, and kilometres as units.

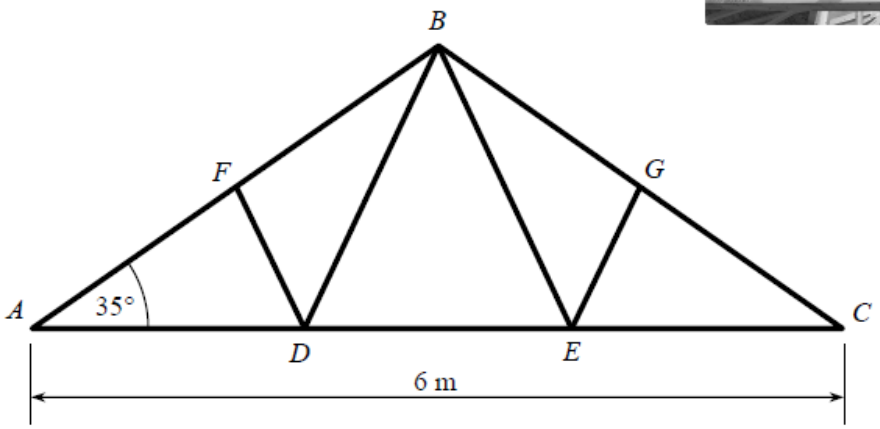
(b) Find the equation of the line along which the ship is moving.

(c) Find the shortest distance between the ship and the lighthouse during the journey.

Paper 2 – Project Maths – Section B Q9 B

(b) Roofs of buildings are often supported by frameworks of timber called *roof trusses*.

A quantity surveyor needs to find the total length of timber needed in order to make the triangular truss shown below.



The length of $[AC]$ is 6 metres, and the pitch of the roof is 35°, as shown.
$|AD| = |DE| = |EC|$ and $|AF| = |FB| = |BG| = |GC|$.

(i) Calculate the length of $[AB]$, in metres, correct to two decimal places.

(ii) Calculate the total length of timber required to make the truss.