

## Questions

Q1.

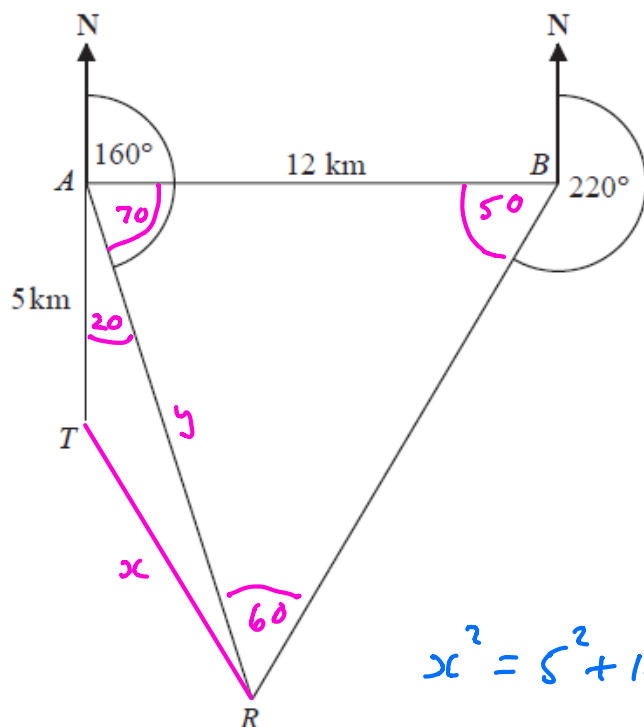


Diagram NOT  
accurately drawn

$$\frac{12}{\sin 60} = \frac{y}{\sin 50}$$

$$y = \frac{12}{\sin 60} \times \sin 50$$

$$y = 10.615$$

$$x^2 = 5^2 + 10.615^2 - 2 \times 5 \times 10.615 \cos 20$$

$$x^2 = 37.93$$

$$x = 6.159$$

$$x = 6.2 \text{ to 1 d.p.}$$

There is a coastguard station at point A and at point B.  
B is due East of A.  
The distance from A to B is 12 km.

There is a rowing boat at point R.  
R is on a bearing of  $160^\circ$  from A.  
R is on a bearing of  $220^\circ$  from B.

There is a speedboat at point T.  
T is 5 km due South of A.

Work out the shortest distance from T to R.  
Give your answer correct to 1 decimal place.  
You must show all your working.

6.2

.....km

(Total for question = 5 marks)

Q2.

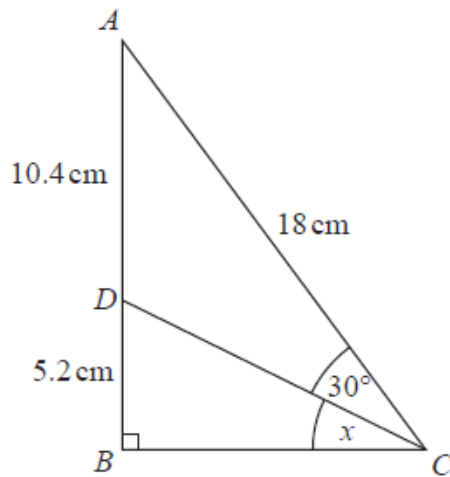


Diagram NOT  
accurately drawn

$$\sin(30+x) = \frac{10.4+5.2}{18}$$

$$30+x = \sin^{-1}\left(\frac{15.6}{18}\right)$$

$$30+x = 60.1^\circ$$

$$x = 60.1 - 30$$

$$x = 30.1^\circ$$

$ABC$  is a right-angled triangle.  
 $D$  is a point on  $AB$ .

Angle  $ACD = 30^\circ$   
 $AD = 10.4$  cm  
 $DB = 5.2$  cm  
 $AC = 18$  cm

Work out the size of the angle marked  $x$ .  
 Give your answer correct to 1 decimal place.

$$x = 30.1^\circ$$

(Total for question = 4 marks)

Q3.

\* The diagram shows the triangle  $PQR$ .

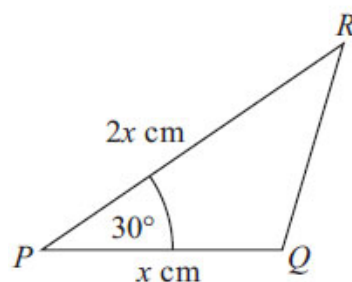


Diagram NOT  
accurately drawn

$$\text{Area of } \triangle = \frac{1}{2}ab \sin C$$

$$\frac{1}{2} \times x \times 2x \sin 30 = A$$

$$\frac{2x^2}{4} = A$$

$$\frac{x^2}{2} = A$$

$$x^2 = 2A$$

$$x = \sqrt{2A}$$

$PQ = x$  cm  
 $PR = 2x$  cm  
 Angle  $QPR = 30^\circ$

The area of triangle  $PQR = A \text{ cm}^2$

Show that  $x = \sqrt{2A}$

(Total for Question is 3 marks)

Q4. The diagram shows triangle LMN.

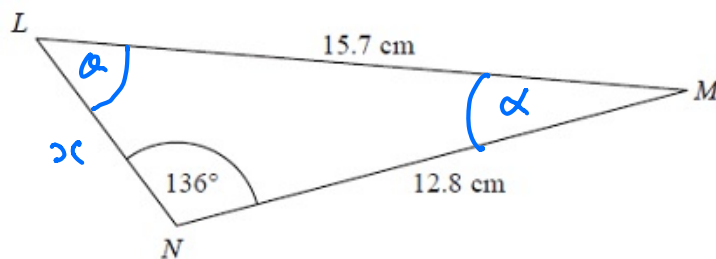


Diagram NOT  
accurately drawn

$$\frac{15.7}{\sin 136} = \frac{12.8}{\sin \alpha}$$

$$15.7 \sin \alpha = 12.8 \times \sin 136$$

$$\sin \alpha = \frac{12.8 \times \sin 136}{15.7}$$

$$\alpha = \sin^{-1}\left(\frac{12.8 \times \sin 136}{15.7}\right)$$

..... cm

Calculate the length of LN.

Give your answer correct to 3 significant figures.

$$\frac{x}{\sin 9.5} = \frac{15.7}{\sin 136}$$

$$x = \frac{15.7 \times \sin 9.5}{\sin 136}$$

$$x = 3.73 \text{ cm}$$

Q5.

ABC is a triangle.

(Total for Question is 5 marks)

$$\alpha = 34.5^\circ$$

$$\alpha = 180 - 136 - 34.5 = 9.5^\circ$$

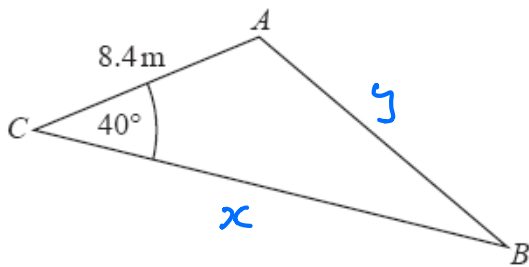


Diagram NOT  
accurately drawn

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

$$\frac{1}{2} \times x \times 8.4 \sin 40^\circ = 100$$

$$x = \frac{100}{(4.2 \sin 40^\circ)}$$

$$x = 37.04 \text{ m}$$

AC = 8.4m

Angle ACB =  $40^\circ$

The area of the triangle =  $100\text{m}^2$ .

Work out the length of AB.

Give your answer correct to 3 significant figures.

You must show all your working.

cosine rule

$$y^2 = 8.4^2 + 37.04^2 - 2 \times 8.4 \times 37.04 \cos 40^\circ$$

$$y^2 = 965.83$$

$$y = 31.1 \text{ m}$$

$$AB = 31.1 \text{ m}$$

(Total for question = 5 marks)

Q6.

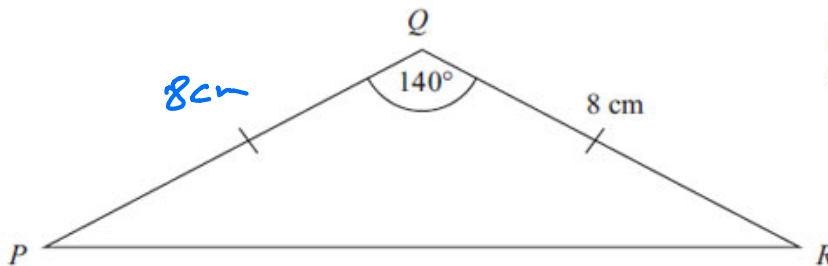


Diagram NOT  
accurately drawn

Calculate the length of PR.

Give your answer correct to 3 significant figures.

$$PR^2 = 8^2 + 8^2 - 2 \times 8 \times 8 \cos 140^\circ$$

$$PR^2 = 226.05$$

$$PR = 15.0 \text{ cm}$$

..... cm

(Total for Question is 3 marks)

Q7.

Jerry wants to cover a triangular field,  $ABC$ , with fertiliser.

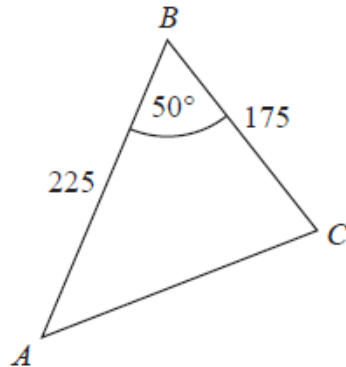


Diagram NOT  
accurately drawn

$$\text{Area} = \frac{1}{2}ac \sin B$$

$$\begin{aligned} & \frac{1}{2} \times 227.5 \times 177.5 \sin 50.5 \\ &= 15,579.5826 \\ &= 15,580 \text{ m}^2 \end{aligned}$$

Here are the measurements Jerry makes

angle  $ABC = 50^\circ$  correct to the nearest degree,  
 $BA = 225$  m correct to the nearest 5 m,  
 $BC = 175$  m correct to the nearest 5 m.

Upper Bounds

$$\begin{aligned} & 50.5 \\ & 227.5 \\ & 177.5 \end{aligned}$$

Work out the upper bound for the area of the field.  
You must show your working.

$$\dots\dots\dots 15,580 \dots\dots\dots \text{m}^2$$

(Total for Question is 3 marks)

Q8.

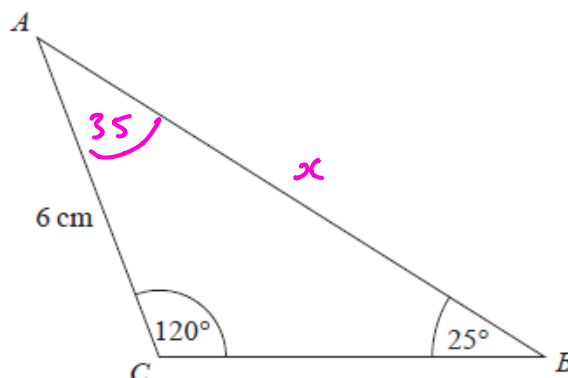


Diagram NOT  
accurately drawn

$$\frac{x}{\sin 120} = \frac{6}{\sin 25}$$

$$x = \frac{6}{\sin 25} \times \sin 120$$

$$x = 12.295$$

In triangle  $ABC$ ,

$$\text{Area} = \frac{1}{2} \times 12.295 \times 6 \sin 35^\circ$$

AC = 6 cm

Angle ACB =  $120^\circ$

Angle ABC =  $25^\circ$

Work out the area of triangle ABC.

Give your answer correct to 1 decimal place.

You must show all your working.

21.2

..... cm<sup>2</sup>

(Total for question = 4 marks)

$$\text{Area} = 19 = \frac{1}{2} \times 5.4 \times 7.3 \sin \theta$$

$$\frac{38}{5.4 \times 7.3} = \sin \theta$$

$$\theta = \sin^{-1}\left(\frac{38}{5.4 \times 7.3}\right) = 74.57^\circ$$

Q9.

ABC is an acute angled triangle.

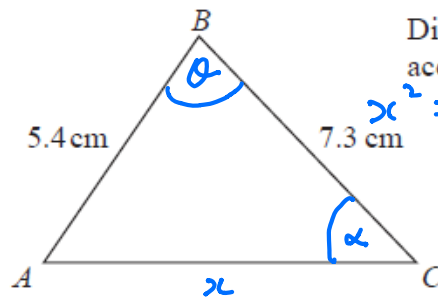


Diagram NOT  
accurately drawn

$$x^2 = 5.4^2 + 7.3^2 - 2 \times 5.4 \times 7.3 \cos 74.57$$

$$x^2 = 61.47$$

$$x = 7.841 \text{ cm}$$

The area of triangle ABC is 19 cm<sup>2</sup>.

Work out the size of angle ACB.

Give your answer correct to 3 significant figures.

41.6

..... °

$$\frac{5.4}{\sin \alpha} = \frac{7.841}{\sin 74.57}$$

$$7.841 \sin \alpha = 5.4 \sin 74.57^\circ$$

$$\sin \alpha = \frac{5.4 \sin 74.57^\circ}{7.841}$$

$$\alpha = \sin^{-1}\left(\frac{5.4 \sin 74.57^\circ}{7.841}\right) = 41.6$$

(Total for question = 6 marks)

Q10.

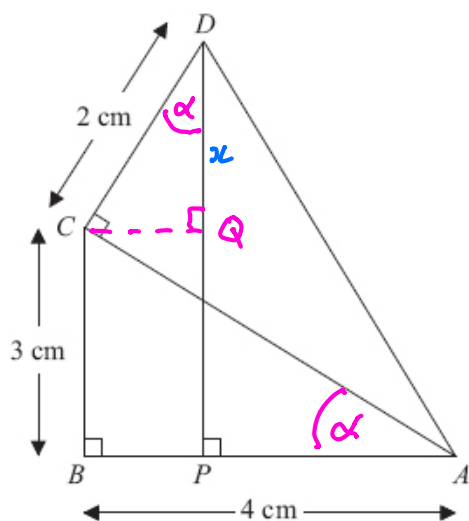


Diagram **NOT**  
accurately drawn

In  $\triangle CDA$

$$\alpha = \tan^{-1} \frac{3}{4} = 36.87^\circ$$

$$\cos \alpha = \frac{x}{2}$$

$$2 \cos \alpha = x$$

$$2 \cos 36.87^\circ = x$$

$$x = 1.60 \text{ to 3 s.f.}$$

$$DP = PQ + QP$$

$$= 1.60 + 3$$

$$DP = 4.6 \text{ cm}$$

In the diagram,

$ABC$ ,  $ACD$  and  $APD$  are right-angled triangles.

$AB = 4 \text{ cm}$ .

$BC = 3 \text{ cm}$ .

$CD = 2 \text{ cm}$ .

Work out the length of  $DP$ .

.....cm

**(Total for Question is 5 marks)**