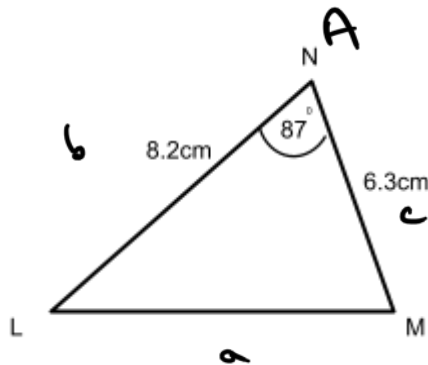


QT - The Cosine Rule



1. Work out the length LM correct to 3 significant figures.

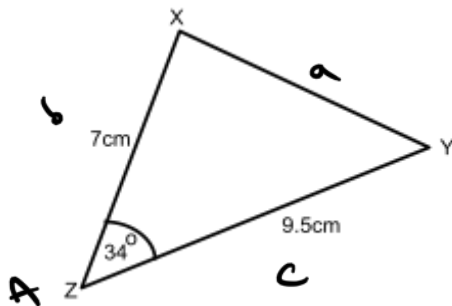
(3 marks)



$$\begin{aligned}
 a^2 &= b^2 + c^2 - 2bc \cos A \\
 &= 8.2^2 + 6.3^2 - 2(8.2)(6.3) \cos 87^\circ \\
 &= 106.93 - 5.407350999 \\
 a^2 &= 101.522649 \\
 a &= 10.07584483 \\
 \underline{\underline{a}} &= \underline{\underline{10.1}} \text{ (3sf)}
 \end{aligned}$$

2. Work out the length XY correct to 3 significant figures.

(3 marks)



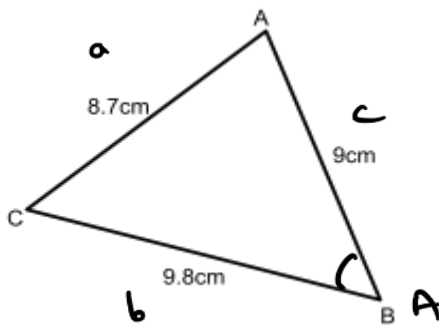
$$\begin{aligned}
 a^2 &= b^2 + c^2 - 2bc \cos A \\
 &= 7^2 + 9.5^2 - 2(7)(9.5) \cos 34^\circ \\
 &= 139.25 - 110.2619971 \\
 &= 28.98800285 \\
 a &= 5.3840507 \\
 \underline{\underline{a}} &= \underline{\underline{5.38}} \text{ cm (3sf)}
 \end{aligned}$$

QT - The Cosine Rule



3. Find the size of angle ABC correct to 1 decimal place.

(3 marks)



$$\begin{aligned}\cos A &= \frac{b^2 + c^2 - a^2}{2bc} \\ &= \frac{9.8^2 + 9^2 - 8.7^2}{2(9.8)(9)}\end{aligned}$$

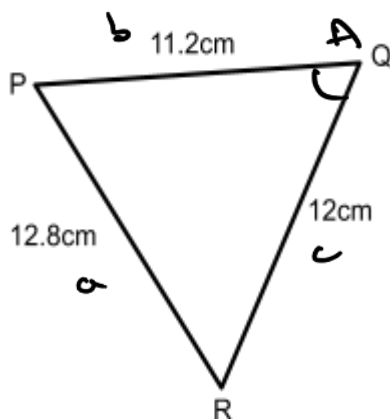
$$\cos A = 0.574546$$

$$\cos^{-1}(\text{Ans}) = 54.93212^\circ$$

$$\angle ABC = \underline{\underline{54.9^\circ}} \text{ (1dp)}$$

4. Find the size of angle PQR correct to 2 decimal places.

(3 marks)



$$\begin{aligned}\cos A &= \frac{b^2 + c^2 - a^2}{2bc} \\ &= \frac{11.2^2 + 12^2 - 12.8^2}{2(11.2)(12)}\end{aligned}$$

$$= \frac{11}{28}$$

$$\cos^{-1}(\text{Ans}) = 66.8676$$

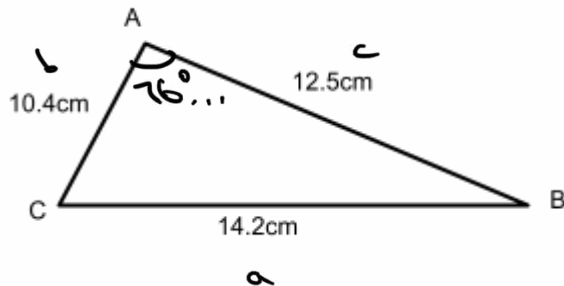
$$\angle PQR = \underline{\underline{66.87^\circ}} \text{ (2dp)}$$

QT - The Cosine Rule



$$\frac{1}{2} ab \sin C$$

5. Work out the area of triangle ABC. Give your answer to a suitable degree of accuracy. (4 marks)



$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$= \frac{10.4^2 + 12.5^2 - 14.2^2}{2(10.4)(12.5)}$$

$$= \frac{6277}{26000}$$

$$\cos^{-1}(\text{Ans}) = 76.02945^\circ$$

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

$$= \frac{1}{2} (10.4)(12.5) \sin(76^\circ)$$

$$= 63.077 \text{ cm}^2$$

$$\therefore \text{AREA} = \underline{\underline{63.1 \text{ cm}^2}} \text{ (1 dp)}$$

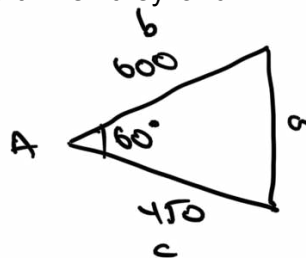
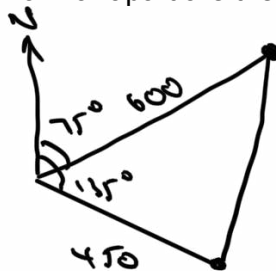
6. Two airplanes leave an airport.

Airplane A flies on a bearing of 075° for 600km, and then lands.

Airplane B flies on a bearing of 135° for 450km and then lands.

How far apart are the two aircraft when they land?

(4 marks)



$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$= 600^2 + 450^2 - 2(600)(450) \cos 60$$

$$= 562500 - 270000$$

$$= 292500$$

$$a = 540.83269$$

$$\text{Distance} = \underline{\underline{540.8 \text{ km}}} \text{ (1 dp)}$$

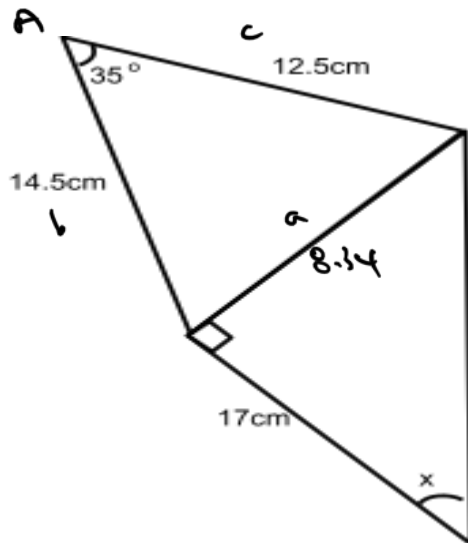
QT - The Cosine Rule



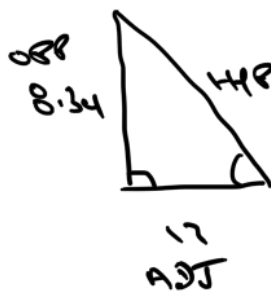
7. Find the value of x .

Give your answer correct to 2 decimal place.

(5 marks)



$$\begin{aligned}
 a^2 &= b^2 + c^2 - 2bc \cos A \\
 &= 14.5^2 + 12.5^2 - 2(14.5)(12.5) \cos 35^\circ \\
 &= 366.5 - 296.9426161 \\
 &= 69.557 \\
 a &= 8.34
 \end{aligned}$$



$$\begin{aligned}
 &\text{SOH CAH TOA} \\
 \tan x &= \frac{\text{opp}}{\text{adj}} \\
 &= \frac{8.34}{17} = 0.490588 \\
 \tan^{-1}(\text{Ans}) &= 26.13^\circ \\
 \underline{\underline{\text{Angle } x}} &= \underline{\underline{26.13^\circ}}
 \end{aligned}$$

QT - The Cosine Rule



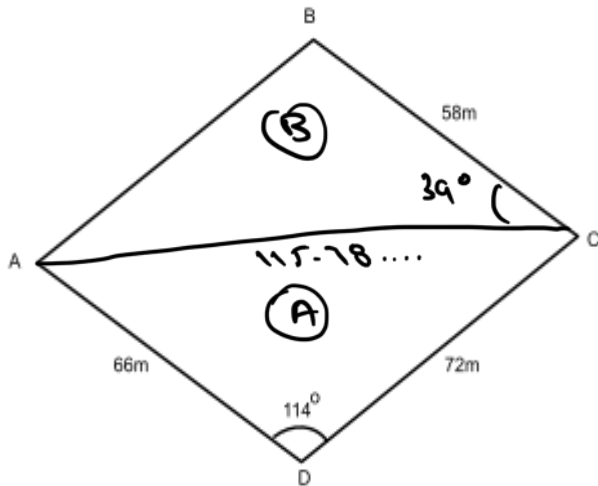
8. ABCD is a quadrilateral.

Angle BCA is 39°

Work out the area of ABCD.

Give your answer correct to 3 significant figures.

(5 marks)



Triangle (A)

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$= 66^2 + 72^2 - 2(66)(72) \cos 114$$

$$= 9540 - (-3865.625056)$$

$$a^2 = 13405.62506$$

$$a = 115.782663$$

AREA TRIANGLE (A)

$$\frac{1}{2} ab \sin C$$

$$\frac{1}{2} (66)(72)(\sin 114)$$

$$= 2170.584 \text{ m}^2$$

AREA TRIANGLE (B)

$$\frac{1}{2} ab \sin C$$

$$\frac{1}{2} (115.78...) (58)(\sin 39)$$

$$= 213.067 \text{ m}^2$$

$$\text{TOTAL AREA} = \text{(A)} + \text{(B)}$$

$$= 4283.651312$$

$$= \underline{\underline{4280 \text{ m}^2}} \quad (3 \text{ sf})$$