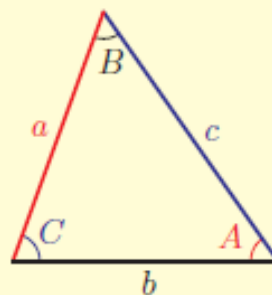


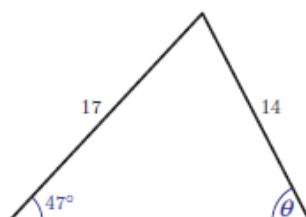
The sine rule

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



Example!

Find the size of the angle marked θ , giving your answer to the nearest degree.



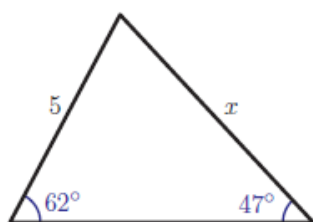
EXAM HINT

In an examination, a question will often alert you to look for two possible answers. However, if it doesn't, you should check whether the second solution is possible by finding the sum of the known angles.

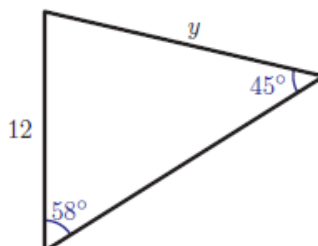
Exercise 11B

1. Find the lengths of sides marked with letters.

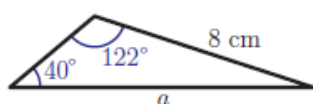
(a) (i)



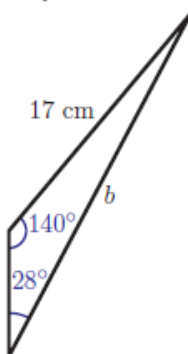
(ii)



(b) (i)

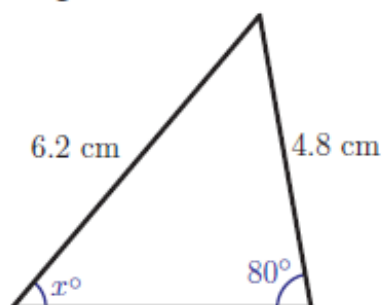


(ii)

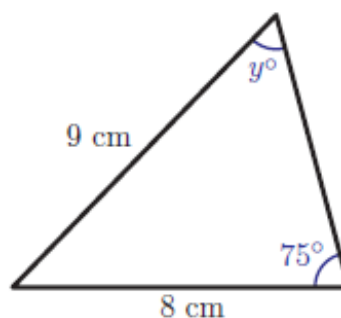


2. Find the angles marked with letters, checking whether there is more than one solution.

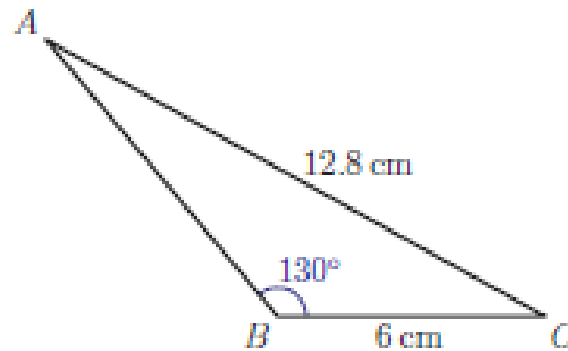
(a) (i)



(ii)

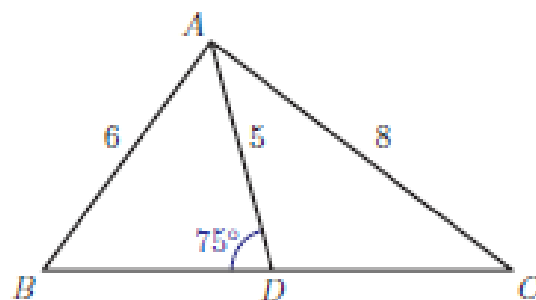


3. Find all the unknown sides and angles of triangle ABC .



4. In triangle ABC , $AB = 6 \text{ cm}$, $BC = 8 \text{ cm}$, $\hat{A}CB = 35^\circ$. Show that there are two possible triangles with these measurements and find the remaining side and angles for each. *[4 marks]*

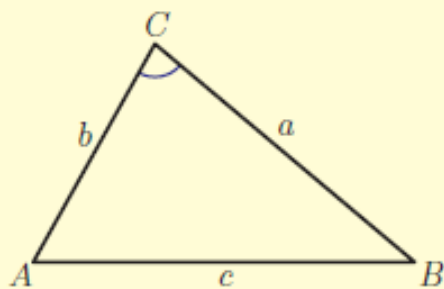
5. In the triangle shown in the diagram, $AB = 6$, $AC = 8$, $AD = 5$ and $\hat{A}DB = 75^\circ$. Find the length of the side BC .



[5 marks]

The Cosine rule

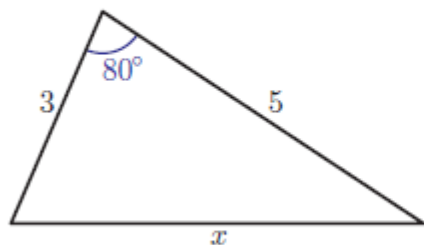
$$c^2 = a^2 + b^2 - 2ab\cos\hat{C}$$



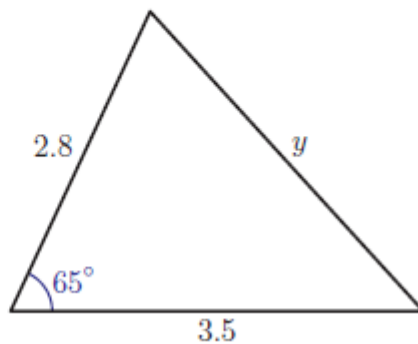
Exercise 11C

1. Find the lengths of the sides marked with letters.

(a) (i)

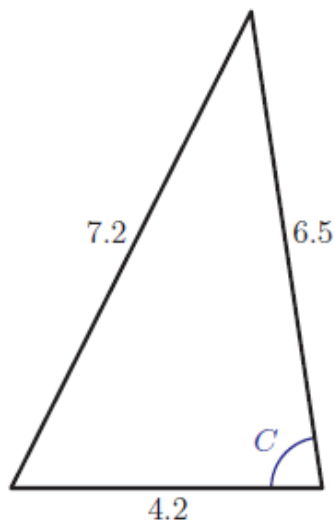


(ii)

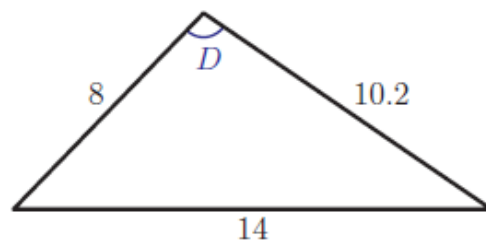


2. Find the angles marked with letters.

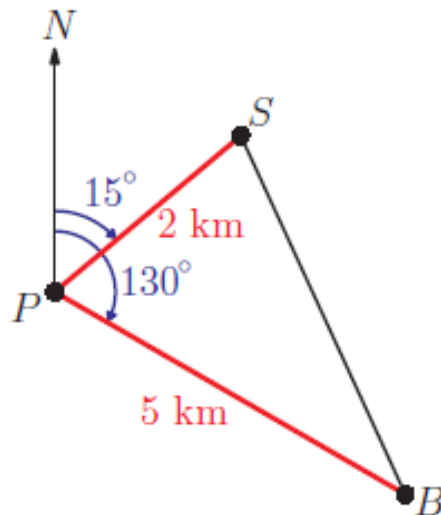
(b) (i)



(ii)

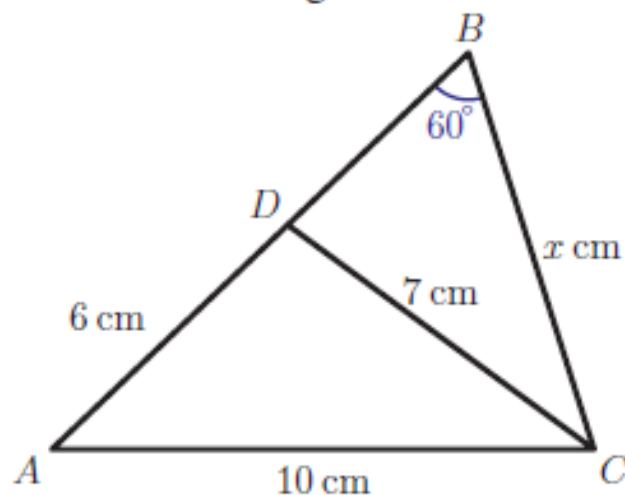


4. Ship S is 2 km from the port at an angle of 15° from North and boat B is 5 km from the port at an angle of 130° from North.



Find the distance between the ship and the boat. [6 marks]

5. Find the value of x in the diagram below.



[6 marks]

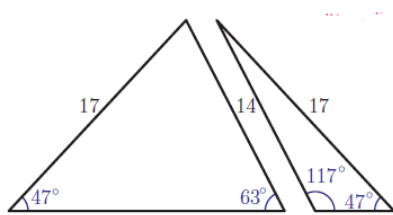


6. In triangle ABC , $AB = (x - 3)$ cm, $BC = (x + 3)$ cm, $AC = 8$ cm and $\hat{BAC} = 60^\circ$. Find the value of x .

[6 marks]

Answers

Example 1)



Exercise 11B

1. (a) (i) 6.04 (ii) 14.4
(b) (i) 10.6 cm (ii) 23.3 cm
2. (a) (i) 49.7° (ii) 59.2°
(b) (i) 74.6° or 105° (ii) 62.0° or 118°
(c) (i) 50.9° (ii) 54.4°
3. 21.0° , 29.0° , 8.09 cm
4. 10.4 cm, 49.9° , 95.1° ; 269 cm, 130° , 15°
5. 9.94 cm

Exercise 11C

1. (a) (i) 5.37 (ii) 3.44

2. (a) 11.515° (i) 100°
(b) (i) 81.5° (ii) 100°

4. 6.12 km

5. 7.95

6. 4.4

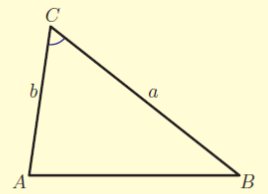
Area of triangle

1. (a) $AB = 2r \sin \theta$, $BC = 2r \cos \theta$
(b) $2r^2 \sin \theta \cos \theta$
(c) $r^2 \sin \theta \cos \theta$
(d) $\frac{1}{2}$
3. 17.7 cm, 29.7 cm^2
4. $4\sqrt{3} \text{ cm}^2$

Area of triangle

The area of the triangle is given by:

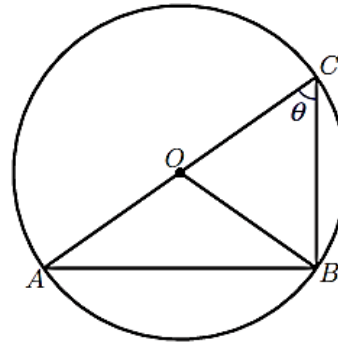
$$\text{area} = \frac{1}{2}ab\sin\hat{C}$$



1. The circle shown in the diagram has centre O and radius r .

- Write down the lengths of AB and BC in terms of r and θ .
- Write down an expression for the area of the triangle ABC .
- Write down an expression for the area of the triangle OBC .
- Hence find the ratio of the two areas in the form

$$\frac{\text{Area}(OBC)}{\text{Area}(ABC)} = k, \text{ where } k \in \mathbb{Q}.$$



[10 marks]

3. In triangle LMN , $LM = 12$ cm, $MN = 7$ cm and $\hat{LMN} = 135^\circ$. Find the length of the side LN and the area of the triangle.

[6 marks]



4. In triangle PQR , $PQ = 8$ cm, $RQ = 7$ cm and $\hat{RPQ} = 60^\circ$. Find the exact difference in areas between the two possible triangles.

[6 marks]