

# SINE AND COSINE RULE

[ESTIMATED TIME: 75 minutes]

# GCSE

(+ IGCSE) EXAM QUESTION PRACTICE

1.

[3 marks]

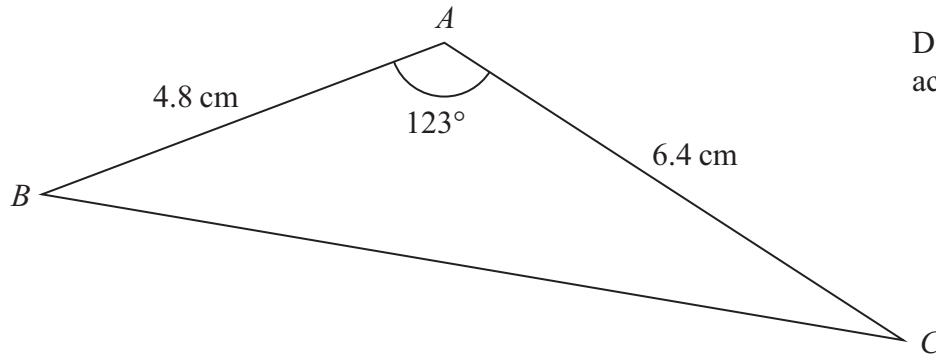


Diagram **NOT** accurately drawn

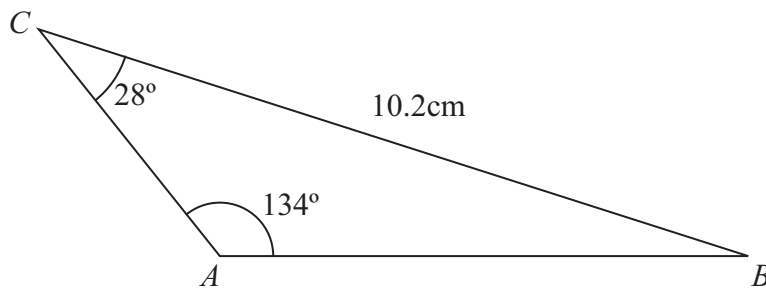
Calculate the length of  $BC$ .  
Give your answer correct to 3 significant figures.

.....cm



The diagram shows triangle  $ABC$ .

Diagram **NOT**  
accurately drawn



Angle  $BCA = 28^\circ$

Angle  $CAB = 134^\circ$

$BC = 10.2$  cm.

Calculate the length of  $AB$ .

Give your answer correct to 3 significant figures.

..... cm



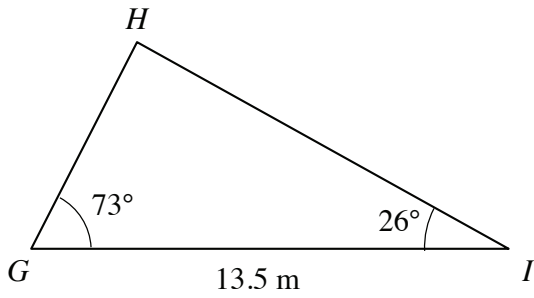


Diagram **NOT**  
accurately drawn

Calculate the length of  $GH$ .  
Give your answer correct to 3 significant figures.

.....  
(4)

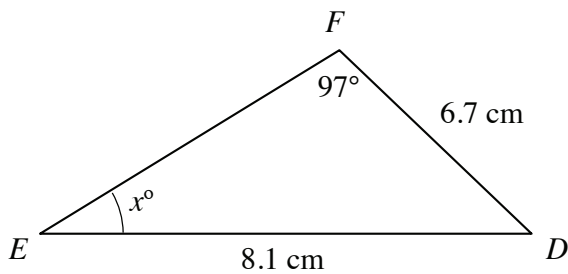


Diagram **NOT**  
accurately drawn

Calculate the value of  $x$ .  
Give your answer correct to 1 decimal place.

.....  
(3)



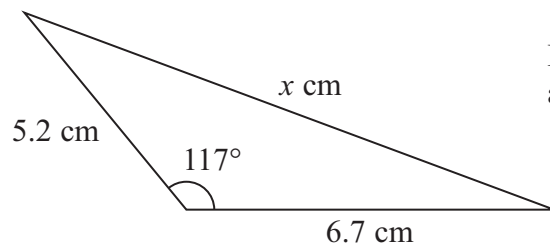


Diagram **NOT**  
accurately drawn

Calculate the value of  $x$ .  
Give your answer correct to 3 significant figures.

$x = \dots\dots\dots$

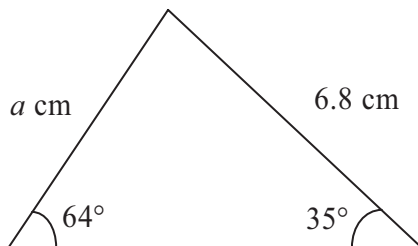


Diagram **NOT**  
accurately drawn

Calculate the value of  $a$ .  
Give your value correct to 3 significant figures.

$a = \dots\dots\dots$



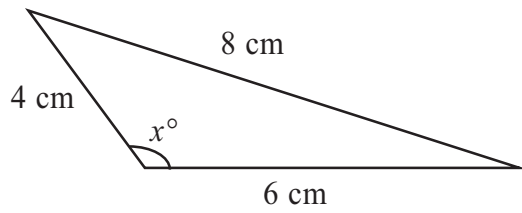


Diagram **NOT**  
accurately drawn

Calculate the value of  $x$ .  
Give your answer correct to 1 decimal place.

$x = \dots\dots\dots$

A triangle has sides of length 4 cm, 6 cm and 8 cm.  
Calculate the size of the largest angle in this triangle.  
Give your answer correct to 1 decimal place.



(4)

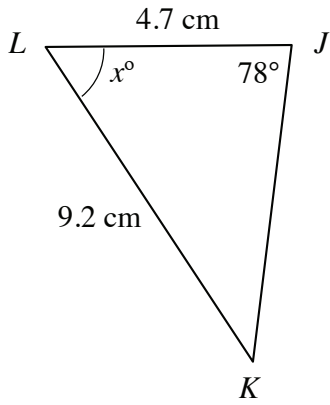


Diagram **NOT**  
accurately drawn

Calculate the value of  $x$ .  
Give your answer correct to 1 decimal place.

.....  
(4)



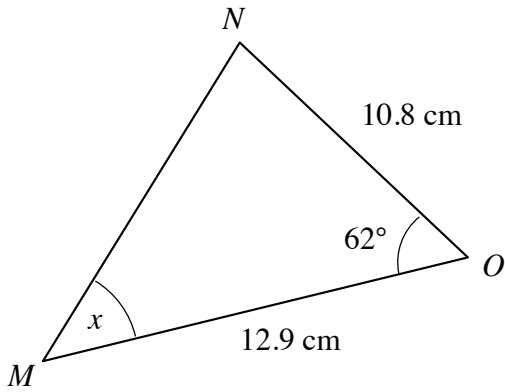


Diagram **NOT**  
accurately drawn

Calculate the size of angle  $NMO$ .  
Give your answer correct to 1 decimal place.

.....  
(5)



A circular clock face, centre  $O$ , has a minute hand  $OA$  and an hour hand  $OB$ .

$OA = 10$  cm.

$OB = 7$  cm.

Calculate the length of  $AB$  when the hands show 5 o'clock.

Give your answer correct to 3 significant figures.

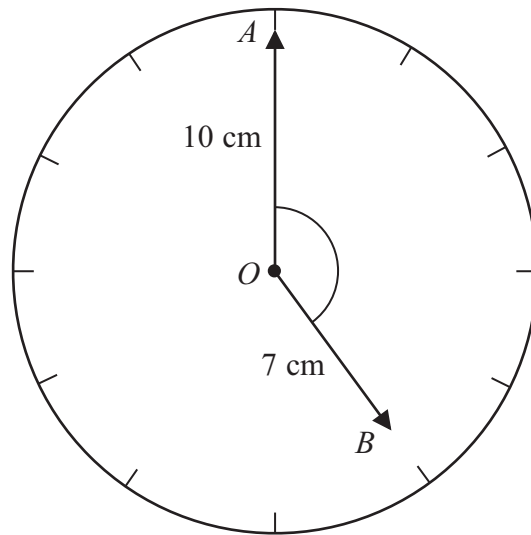


Diagram **NOT**  
accurately drawn

..... cm





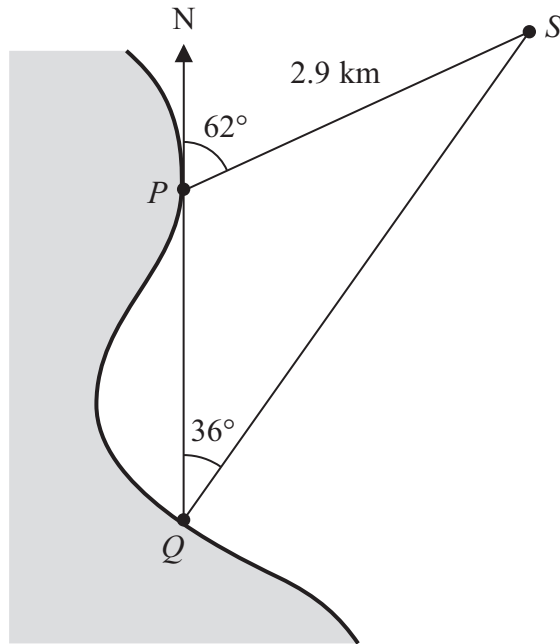


Diagram **NOT**  
accurately drawn

$P$  and  $Q$  are two points on a coast.

$P$  is due North of  $Q$ .

A ship is at the point  $S$ .

$PS = 2.9$  km.

The bearing of the ship from  $P$  is  $062^\circ$

The bearing of the ship from  $Q$  is  $036^\circ$

Calculate the distance  $QS$ .

Give your answer correct to 3 significant figures.

..... km



The sides of triangle  $PQR$  are tangents to a circle.  
 The tangents touch the circle at the points  $S$ ,  $T$  and  $U$ .  
 $QS = 6$  cm.  $PS = 7$  cm.

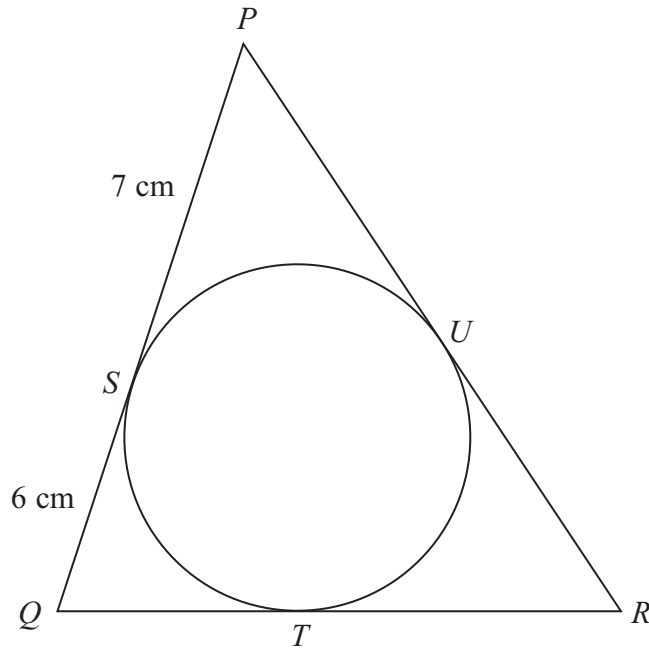


Diagram **NOT** accurately drawn

(a) (i) Write down the length of  $QT$ .

..... cm

(ii) Give a reason for your answer.

.....  
 (2)

The perimeter of triangle  $PQR$  is 42 cm.

(b) Calculate the size of angle  $PQR$ .  
 Give your answer correct to 1 decimal place.

.....  
 (4)



The diagram shows the positions of two ships,  $A$  and  $B$ , and a lighthouse  $L$ .

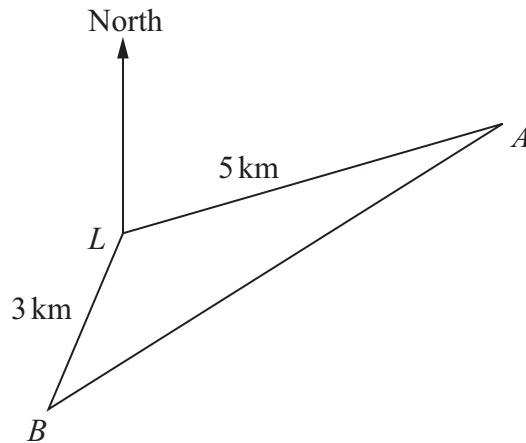


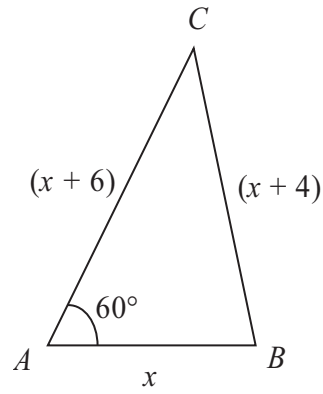
Diagram **NOT**  
accurately drawn

Ship  $A$  is 5 km from  $L$  on a bearing of  $070^\circ$  from  $L$ .  
 Ship  $B$  is 3 km from  $L$  on a bearing of  $210^\circ$  from  $L$ .  
 Calculate the distance between ship  $A$  and ship  $B$ .  
 Give your answer correct to 3 significant figures.

..... km



Diagram **NOT**  
accurately drawn

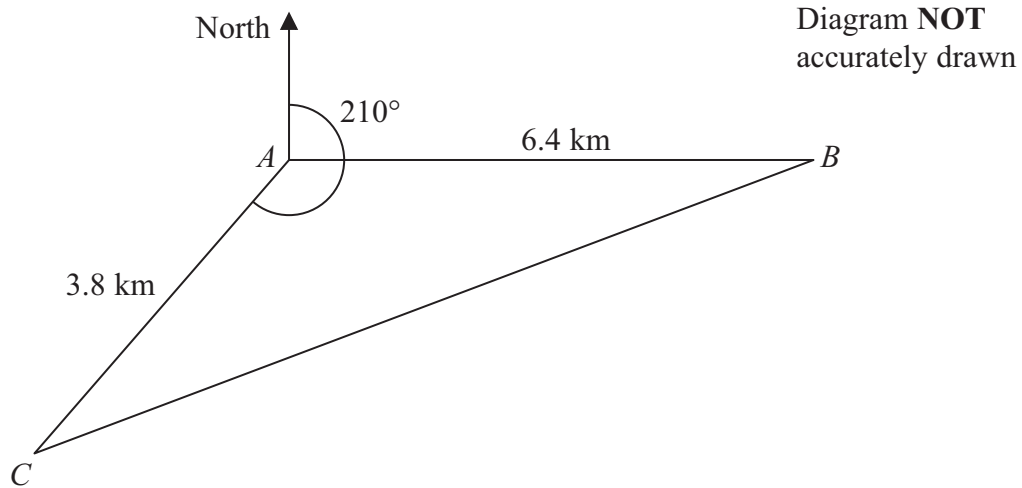


The diagram shows the length, in centimetres, of each side of triangle  $ABC$ .  
Angle  $BAC = 60^\circ$ .

Find the value of  $x$ .

$x = \dots\dots\dots$





*A*, *B* and *C* are 3 villages.

*B* is 6.4 km due east of *A*.

*C* is 3.8 km from *A* on a bearing of 210°

Calculate the bearing of *B* from *C*.

Give your answer correct to the nearest degree.

Show your working clearly.



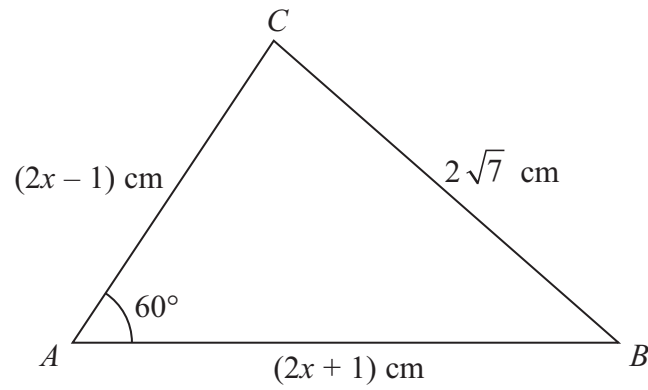


Diagram **NOT**  
accurately drawn

The diagram shows a triangle  $ABC$ .

$AB = (2x + 1)$  cm,  $AC = (2x - 1)$  cm and  $BC = 2\sqrt{7}$  cm.

Angle  $BAC = 60^\circ$

Work out the value of  $x$ .

Show clear algebraic working.

$x = \dots\dots\dots$



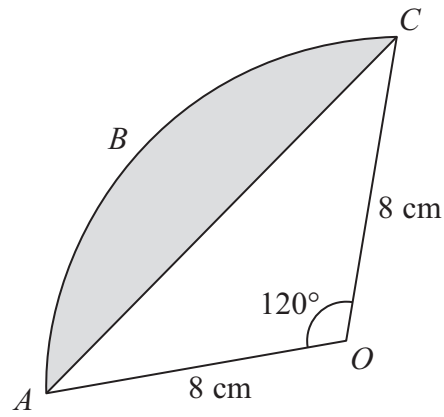


Diagram **NOT**  
accurately drawn

$ABC$  is an arc of a circle with centre  $O$  and radius  $8\text{ cm}$ .

$AC$  is a chord of the circle.

Angle  $AOC = 120^\circ$

Calculate the perimeter of the shaded segment.

Give your answer correct to 3 significant figures.

..... cm



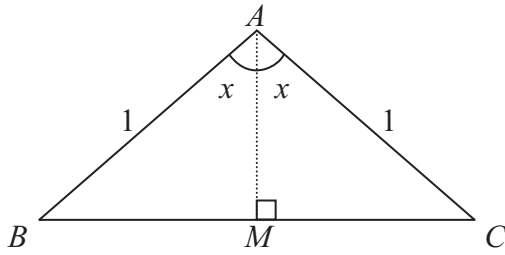


Diagram **NOT**  
accurately drawn

$ABC$  is an isosceles triangle.  
 $AB = AC = 1$   
 $M$  is the midpoint of  $BC$ .

(a) (i) Use trigonometry to find an expression, in terms of  $x$ , for  $BM$ .

.....

(ii) Hence write down an expression, in terms of  $x$ , for  $BC$ .

.....

(2)

(b) Use the cosine rule to find an expression, in terms of  $\cos(2x)$ , for  $BC^2$ .

.....

(1)

(c) Hence show that  $\cos(2x) = 1 - 2(\sin x)^2$

(2)

