

# Sine Rule

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Examples

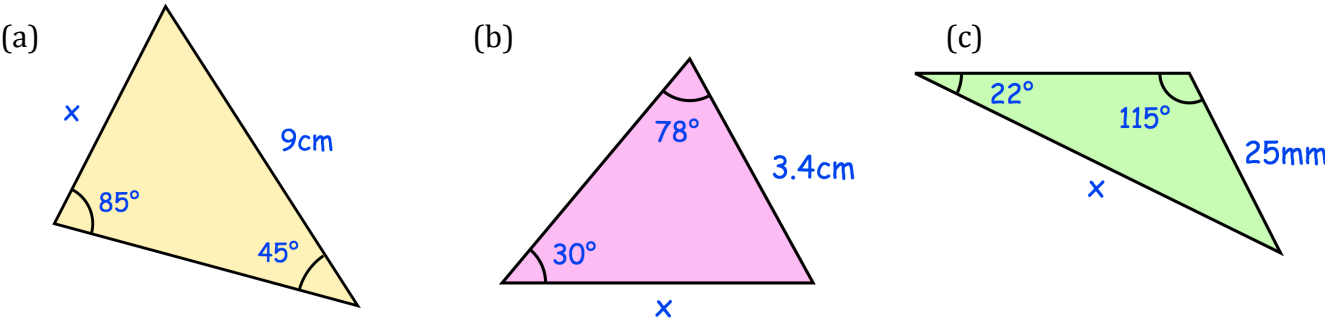


Workout

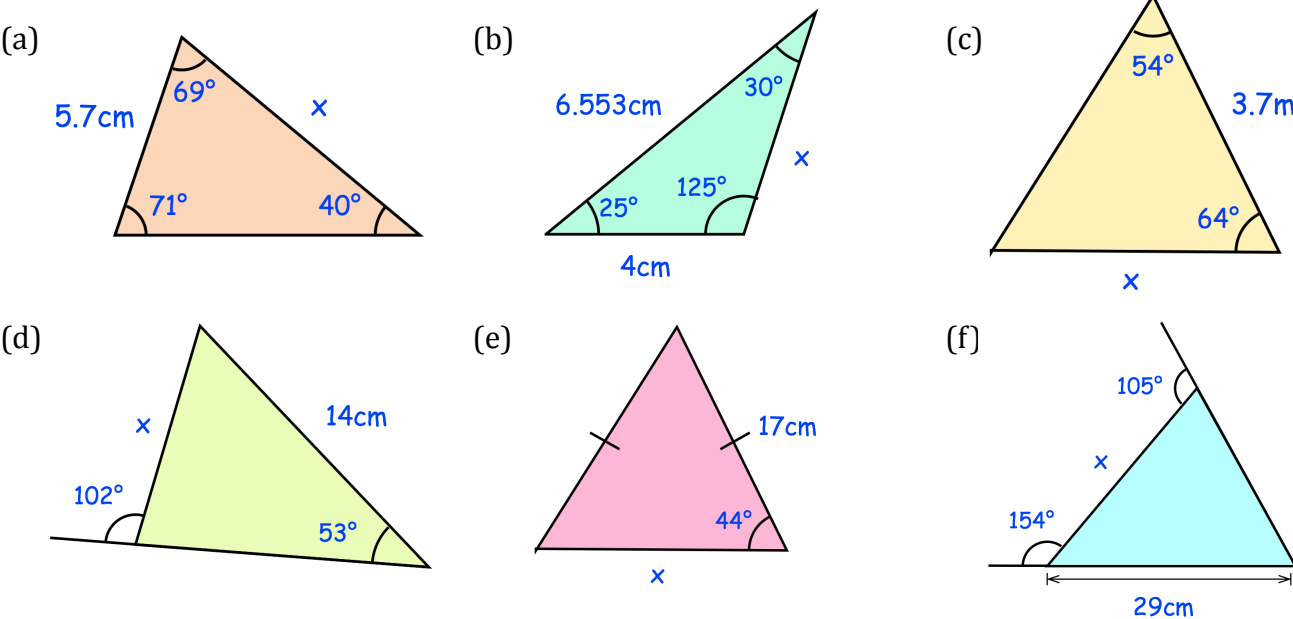
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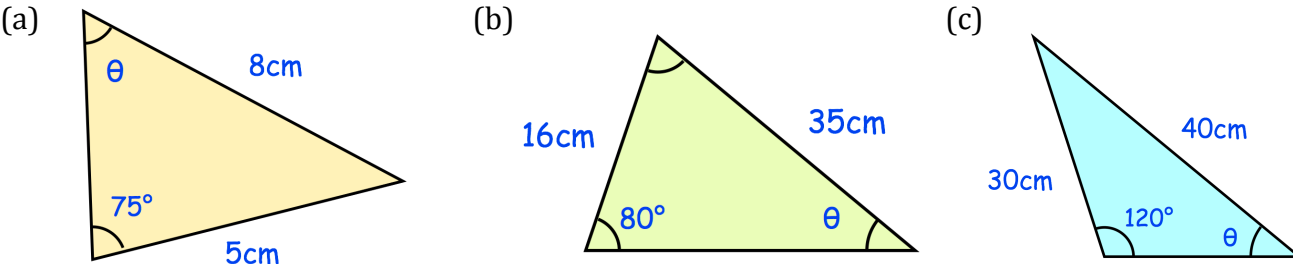
Question 1: Find  $x$  for each of the triangles below.



Question 2: Find  $x$  for each of the triangles below.



Question 3: Find the size of  $\theta$  for each of these triangles.

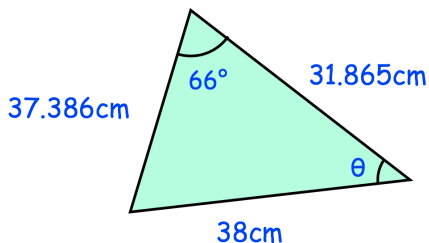


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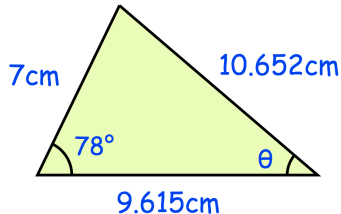
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Question 4: Find the size of  $\theta$  for each of these triangles.

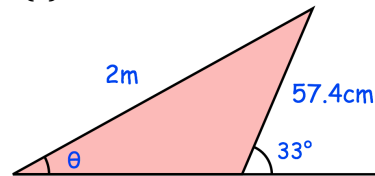
(a)



(b)

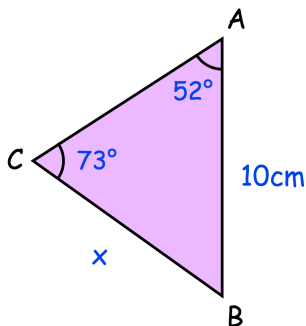


(c)

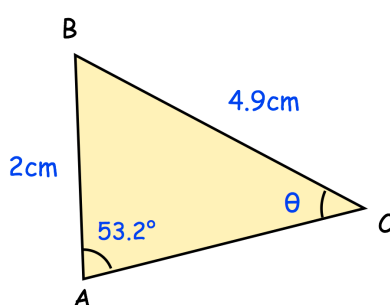


Question 5: Find the missing angle  $\theta$  or side,  $x$ , for each of the triangles below.

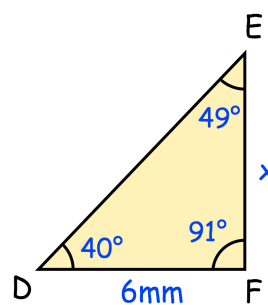
(a)



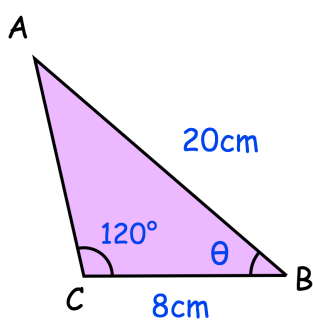
(b)



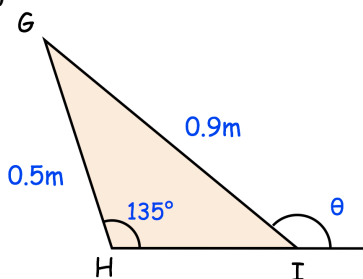
(c)



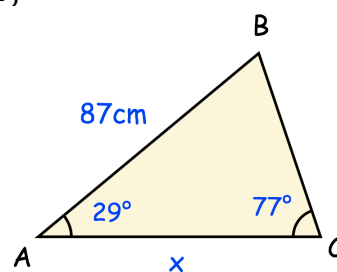
(d)



(e)

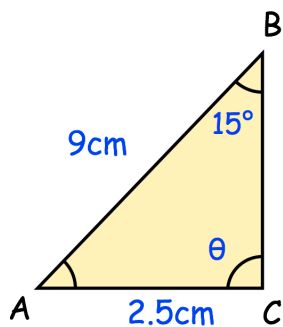


(f)

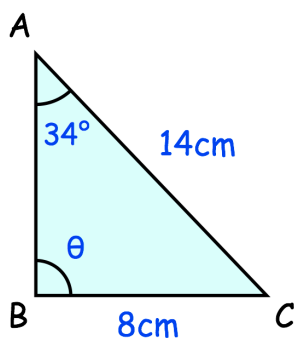


Question 6: The triangles below have two possible values for the angle  $\theta$ . Find the size of these possible angles.

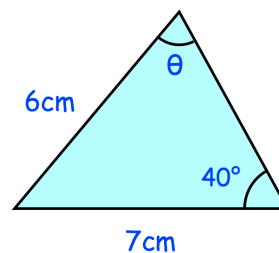
(a)



(b)



(c)



# Sine Rule

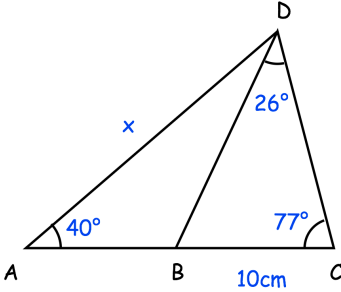
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## Apply

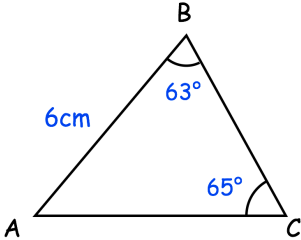
Question 1: ACD is a triangle and B is a point on AC.  
 $BC = 10\text{cm}$   
 Angle  $ACD = 77^\circ$     Angle  $BDC = 26^\circ$

Angle  $DAC = 40^\circ$

- (a) Find the length of BD
- (b) Find the size of angle ABD
- (c) Find the length of AD

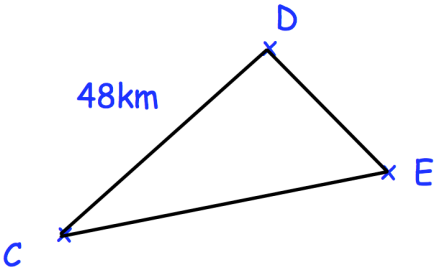


Question 2: Calculate the perimeter of triangle ABC



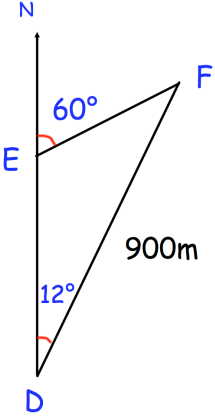
Question 3: Donhampton is 48km from Castletown on a bearing of  $050^\circ$ .  
 Eastville is on a bearing of  $075^\circ$  from Castletown and on a bearing of  $150^\circ$  from Donhampton.

Calculate the distance of Eastville from Castletown.



Question 4: The diagram shows 3 helicopters D, E and F.  
 Helicopter D is due South of helicopter E.  
 The bearing of helicopter F from helicopter E is  $060^\circ$   
 The bearing of helicopter F from helicopter D is  $012^\circ$   
 The distance of helicopter F from helicopter D is 900m

- (a) Find the distance of helicopter F from helicopter E
- (b) Find the distance of helicopter D from helicopter E.

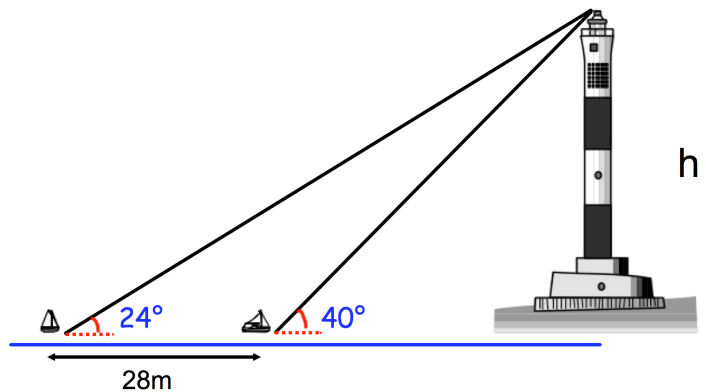


## Sine Rule

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- Question 5: Two small boats are 28m apart.  
The angle of elevation of the boats to the top of the lighthouses are  $24^\circ$  and  $40^\circ$  respectively.

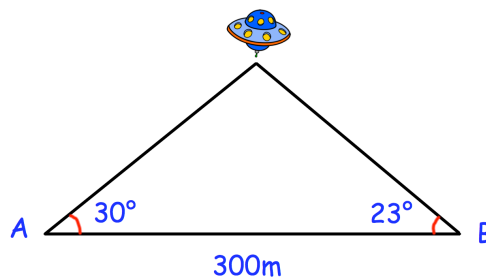
Calculate the height of the lighthouse.



- Question 6: There are two possible triangles DEF, where  $DE = 6.2\text{cm}$ ,  $EF = 7.9\text{cm}$  and  $\angle DFE = 30^\circ$

Sketch both possible triangles with all sides and angles found.

- Question 7: A UFO is flying above two people, standing on the ground at points A and B.  
A and B are 300m apart.  
The angle of elevation of the UFO from A is  $30^\circ$   
The angle of elevation of the UFO from B is  $23^\circ$   
Find the height of the UFO above the ground.

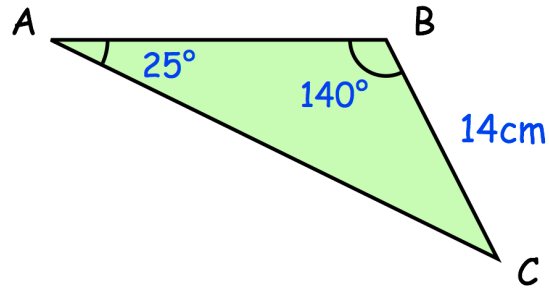


- Question 8: Two ships, A and B, leave a port at midday.  
A travels on a bearing of  $085^\circ$  at a speed of  $18\text{km/h}$ .  
B travels on a bearing of  $113^\circ$  at a speed of  $y\text{ km/h}$ .  
At 14:00 the distance between A and B is  $30\text{km}$ .  
Boat B was travelling at a slower speed than boat A  
Work out  $y$ , the speed of boat B.

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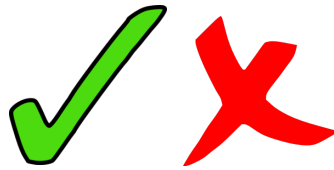
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Question 9: Shown below is triangle ABC.  
All values are correct to 2 significant figures.  
Calculate the upper bound for the length of AC.



Question 10: Prove the Sine Rule.

Answers



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