In which triangular circumstances may we use SOH CAH TOA?

right

In which triangular circumstances may we use the sine rule?

3/4

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

In which triangular circumstances may we use the cosine rule?

ALWAYS

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

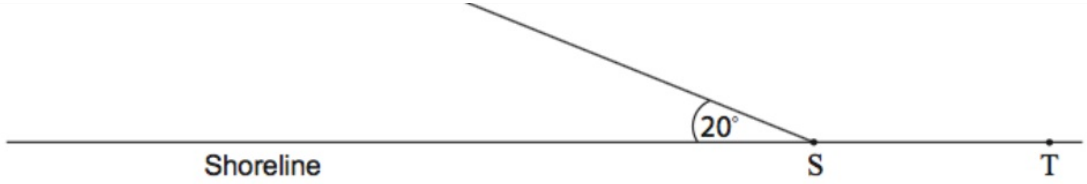
Today's learning objective:

By the end of class, I will be able to utilize the sine and cosine rule, right triangle trig (SOH CAH TOA), and triangular area to solve problems.

For fun, we'll toss in some arc length and sector area because it's deceptively easy.

Today's language objective:

I will share solution strategies in pairs using the mathematical term "inverse."



calc

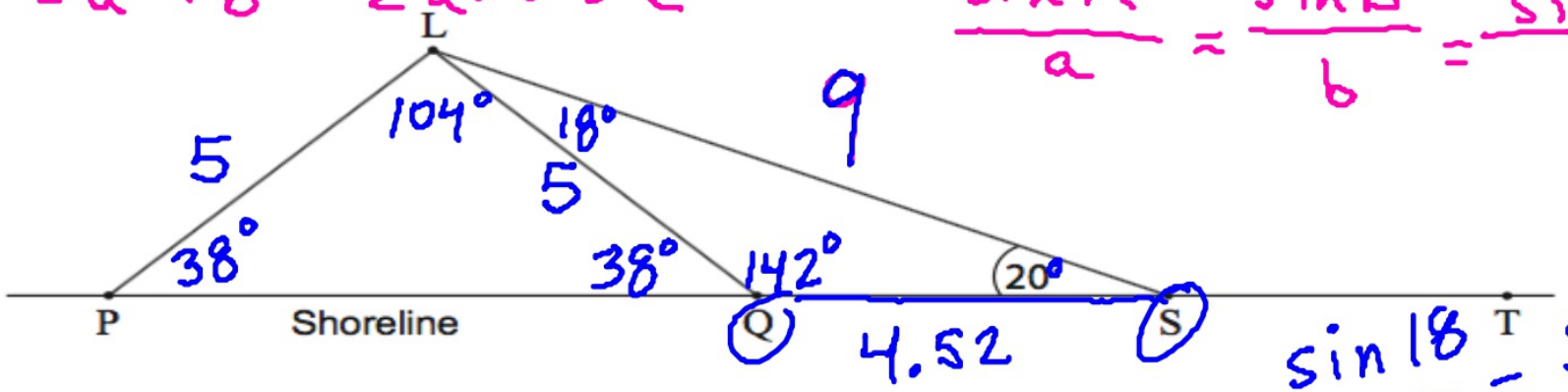
A boat delivers supplies to the island. The boat leaves S, and sails to the island. Its path makes an angle of 20° with the shoreline.

(a) The boat sails at 6 km per hour, and arrives at L after 1.5 hours. Find the distance from S to L. [2]

It is decided to change the position of the supply store, so that its distance from L is 5 km. The following diagram shows the two possible locations P and Q for the supply store.

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

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



$\frac{\sin 18}{x} = \frac{\sin 20}{5}$

(b) Find the size of $S\hat{P}L$ and of $S\hat{Q}L$. [5]

(c) The town wants the new supply store to be as near as possible to the town. Q

(i) State which of the points P or Q is chosen for the new supply store.

(ii) Hence find the distance between the old supply store and the new one. [6]

[Maximum mark: 6]

calc

The following diagram shows triangle ABC.

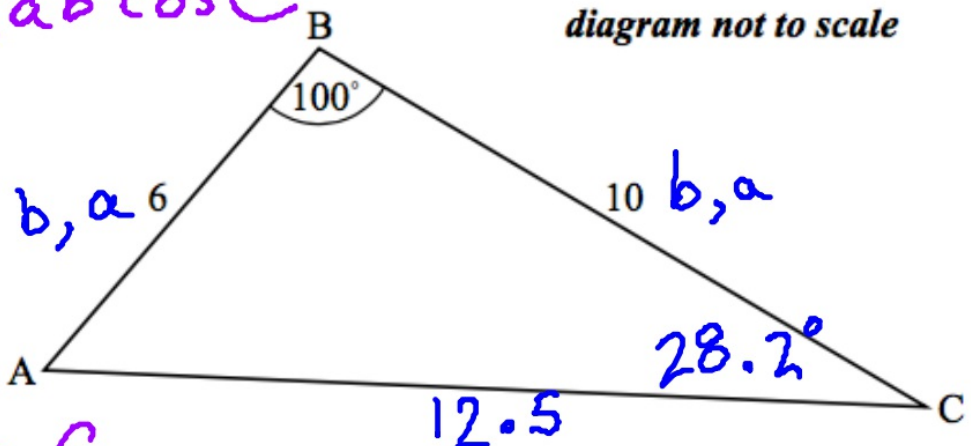


diagram not to scale

$AB = 6\,\text{cm}$, $BC = 10\,\text{cm}$, and $A\hat{B}C = 100^\circ$.

(a) Find AC. [3]

(b) Find $B\hat{C}A$. [3]

(c) Find area = 29.5

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

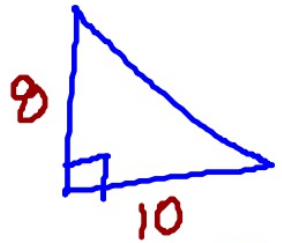
$\frac{\sin A}{a} = \frac{\sin B}{b}$

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

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

$A = \frac{1}{2}(8)(10)(\quad)$

$A = \frac{1}{2}bh$



$\frac{6}{\sin C} = \frac{12.5}{\sin 100}$

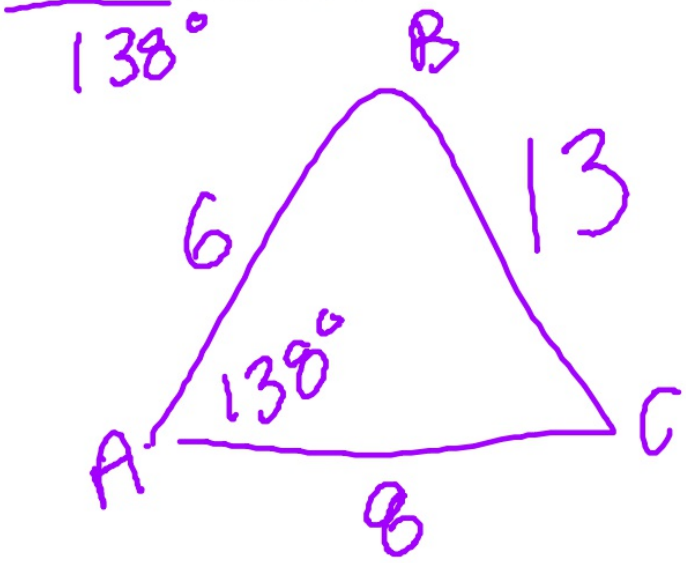
[Maximum mark: 7]

$c^2 = a^2 + b^2 - 2ab\cos($

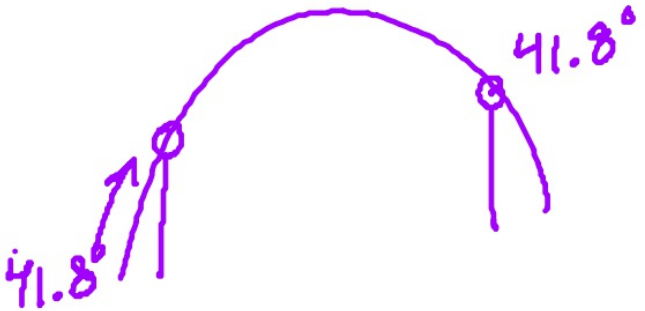
In triangle ABC, AB = 6 cm and AC = 8 cm. The area of the triangle is 16 cm^2.

(a) Find the two possible values for $\hat{A}$. 41.8° ; 138° [

(b) Given that $\hat{A}$ is obtuse, find BC. calc [

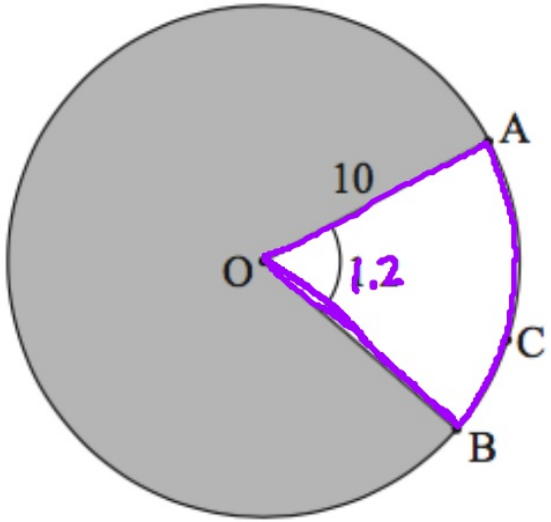


$A = \frac{1}{2}ab\sin C$



The following diagram shows a circle with centre O and a radius of 10 cm. Points A, B and C lie on the circle.

$C = 2\pi r$



non-calc

Length of an arc $l = \theta r$

Angle AOB is 1.2 radians.

(a) Find the length of arc ACB. 12 cm [2]

(b) Find the perimeter of the shaded region. $(20\pi - 12 + 20)$ cm

$(20\pi + 8)$ cm [3]

[Maximum mark: 5]

non-calc

The following diagram shows a right-angled triangle, ABC, where $\sin A = \frac{5}{13}$.

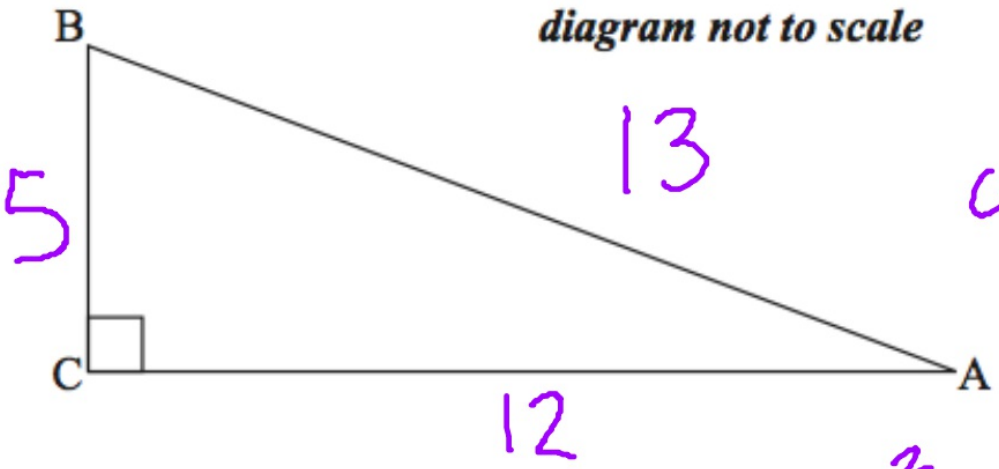


diagram not to scale

$\cos A = \frac{adj}{hyp}$

$13^2 - 5^2 = 144$

$\sqrt{c^2} = \sqrt{144}$

$c = 12$

$\frac{12}{13}$

(a) Show that $\cos A = \frac{12}{13}$.

(b) Find $\cos 2A$. $\frac{119}{169}$

Pythagorean identity	$\cos^2\theta + \sin^2\theta = 1$
Double angle formulae	$\sin 2\theta = 2\sin\theta\cos\theta$
	$\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$

[Maximum mark: 6]

The following diagram shows a circle with centre O and radius 5 cm.

ı of an arc

ſ a sector

$l = \theta r$

$A = \frac{1}{2}\theta r^2$

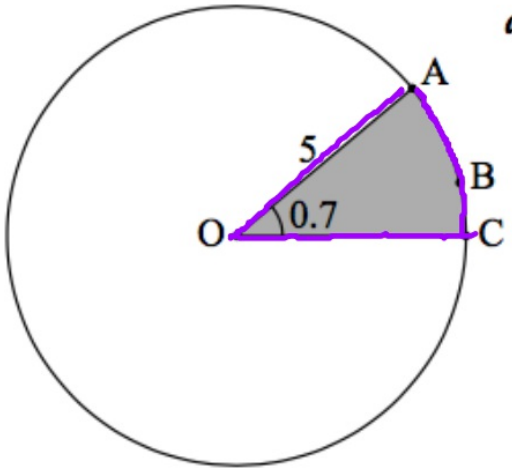


diagram not to scale

uou

non-calc

The points A, B and C lie on the circumference of the circle, and $A\hat{O}C = 0.7$ radians .

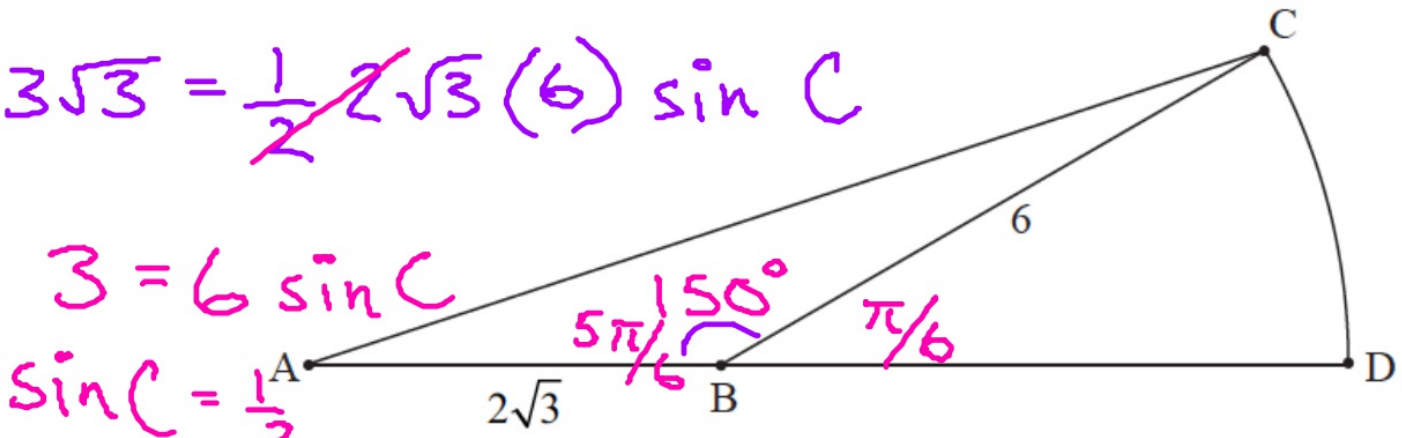
(a) (i) Find the length of the arc ABC. 3.5 cm

(ii) Find the perimeter of the shaded sector. 13.5 cm *[4]*

(b) Find the area of the shaded sector. $8.75\ cm^2$ *[2]*

The following diagram shows a triangle ABC and a sector BDC of a circle with centre B and radius 6 cm. The points A, B and D are on the same line.

diagram not to scale



$3\sqrt{3} = \frac{1}{2} 2\sqrt{3}(6) \sin C$

$3 = 6 \sin C$

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

$5\pi/6$ | 150° | $\pi/6$

non-calc

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

$A = \frac{1}{2}\theta r^2$

$\mathrm{AB} = 2\sqrt{3}\,\mathrm{cm}$, $\mathrm{BC} = 6\,\mathrm{cm}$, area of triangle $\mathrm{ABC} = 3\sqrt{3}\,\mathrm{cm}^2$, $\hat{\mathrm{ABC}}$ is obtuse.

(a) Find $\hat{\mathrm{ABC}}$. 150° [5]

(b) Find the exact area of the sector BDC. [3]

$= \frac{1}{2} \cdot \frac{\pi}{6} \cdot 36$

$= 3\pi\ \mathrm{cm}^2$

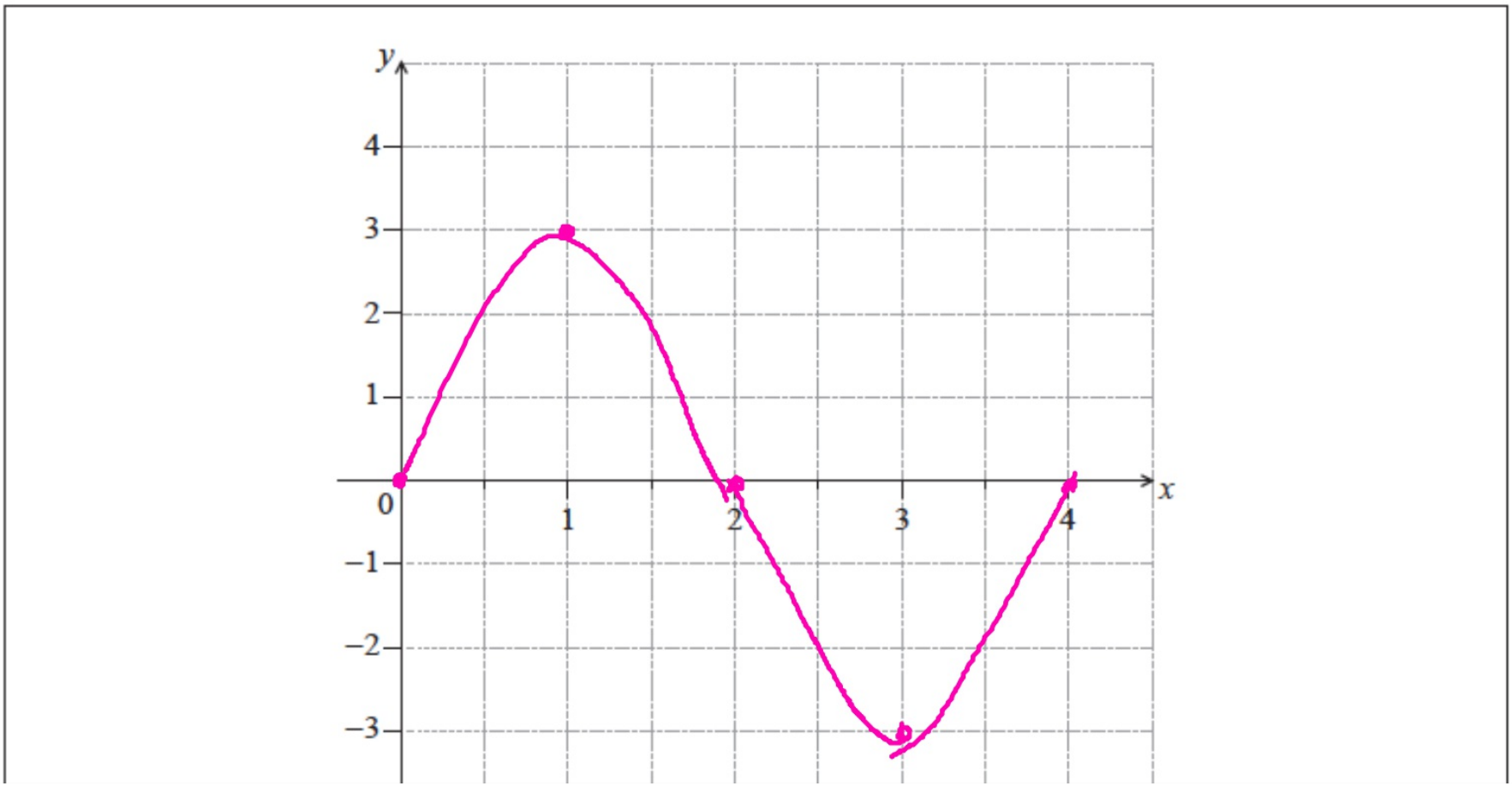
Let $f(x) = 3\sin\left(\frac{\pi}{2}x\right)$, for $0 \le x \le 4$.

non-calc

(a) (i) Write down the amplitude of f. 3

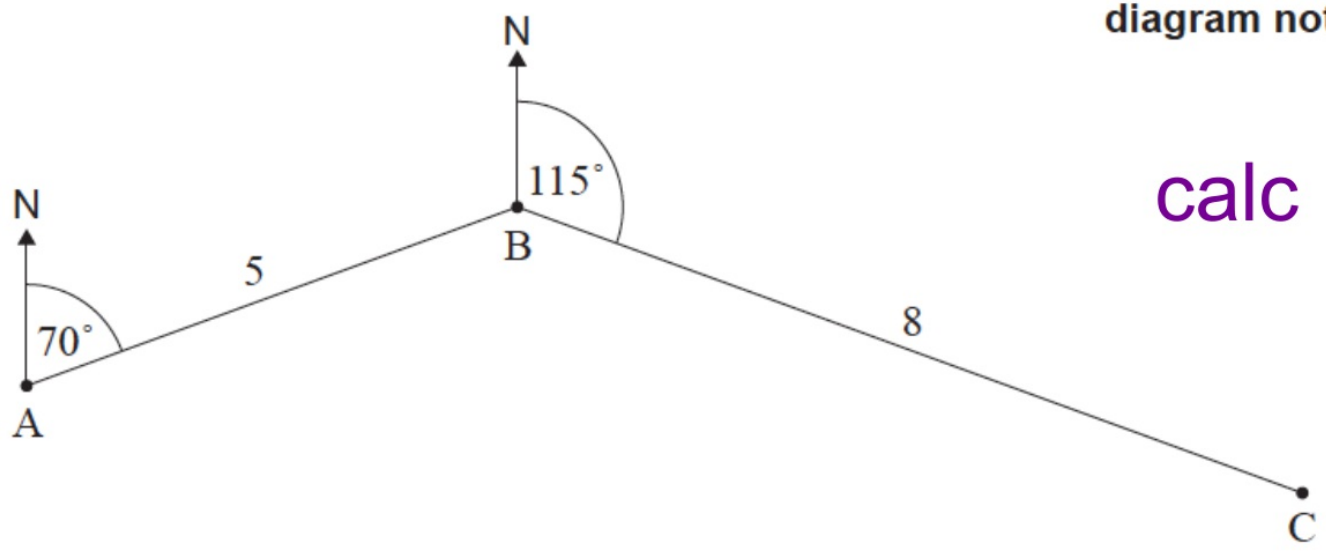
(ii) Find the period of f. 4 $P = \frac{2\pi}{b}$ [3]

(b) On the following grid sketch the graph of f. [4]



The following diagram shows three towns A, B and C. Town B is 5 km from Town A, on a bearing of 070°. Town C is 8 km from Town B, on a bearing of 115°.

diagram not to scale



calc

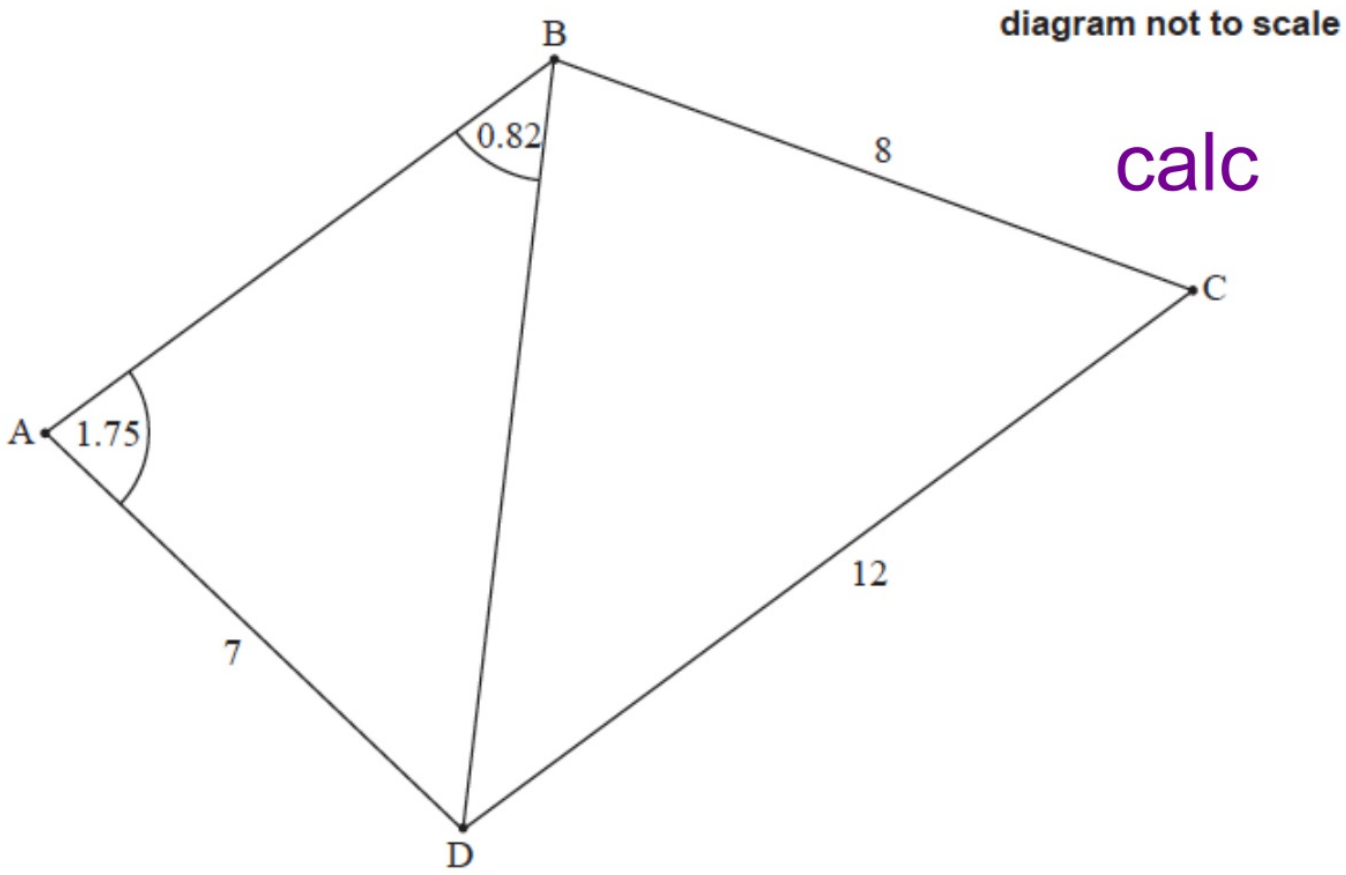
(a) Find $A\hat{B}C$. [2]

(b) Find the distance from Town A to Town C. [3]

(c) Use the sine rule to find $A\hat{C}B$. [2]

[Maximum mark: 6]

The following diagram shows a quadrilateral ABCD.



$AD = 7\,\text{cm}$, $BC = 8\,\text{cm}$, $CD = 12\,\text{cm}$, $D\hat{A}B = 1.75$ radians, $A\hat{B}D = 0.82$ radians.

(a) Find BD. [3]

(b) Find $D\hat{B}C$. [3]