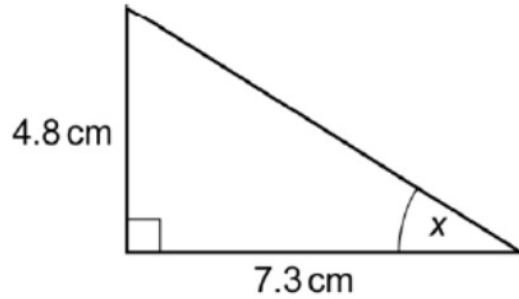


G47 - Trigonometry - Right angled missing angles

OCR

6 The diagram shows a right-angled triangle.



Not to scale

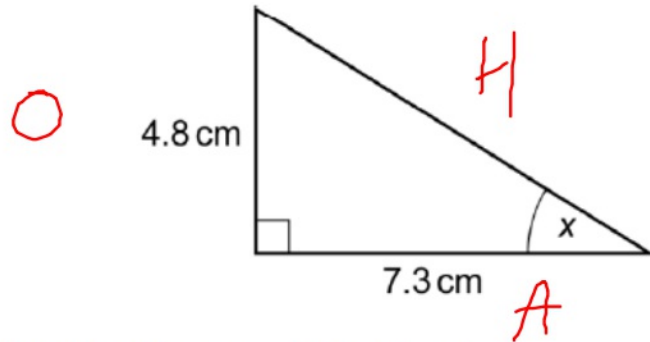
(a) Calculate the area of the triangle.

(a) cm^2 [2]

(b) Calculate angle x .

(b) $x =$ $^\circ$ [3]

6 The diagram shows a right-angled triangle.



Not to scale

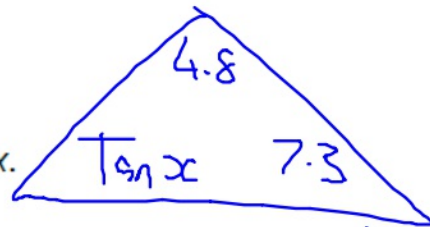
SOH CAH TA

(a) Calculate the area of the triangle.

$$\frac{B \times H}{2} = \frac{7.3 \times 4.8}{2} =$$

(a) 17.52 cm² [2]

(b) Calculate angle x.



$$\text{Tan } x = \frac{4.8}{7.3} = 0.6575\dots$$

$$x = \text{Tan}^{-1} \text{ of } 0.657\dots$$

(b) x = 33.3° ✓ [3]

Video created by W Neill

22 A, B, C and D are four towns.

B is 25 kilometres due East of A.
C is 25 kilometres due North of A.
D is 45 kilometres due South of A.



C ×

A ×

×
B

D ×

Not to scale

(a) Work out the bearing of B from C.

(a)° [2]

22 A, B, C and D are four towns.

B is 25 kilometres due East of A.

C is 25 kilometres due North of A.

D is 45 kilometres due South of A.



C ×

A ×

×
B

D ×

Video created by W Neill

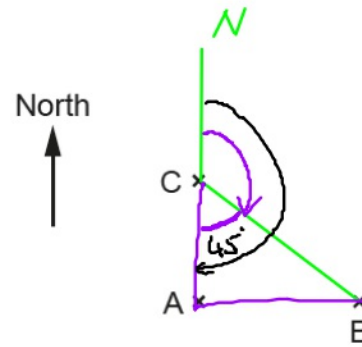
Not to scale

(b) Calculate the bearing of D from B.

..... ° [4]

22 A, B, C and D are four towns.

- B is 25 kilometres due East of A.
- C is 25 kilometres due North of A.
- D is 45 kilometres due South of A.



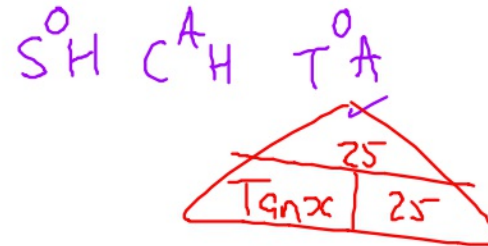
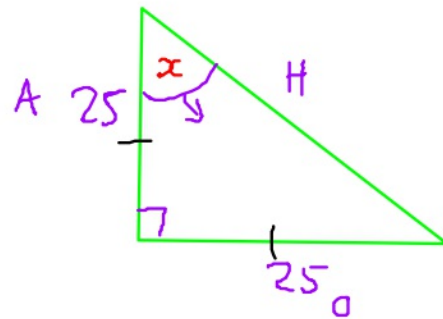
Video created by W Neill

Not to scale

D x

ans
135°

(a) Work out the bearing of B from C.



$$\tan x = 1$$

$$x = \tan^{-1} \text{ of } 1$$

(a) 45° [2]

22 A, B, C and D are four towns.

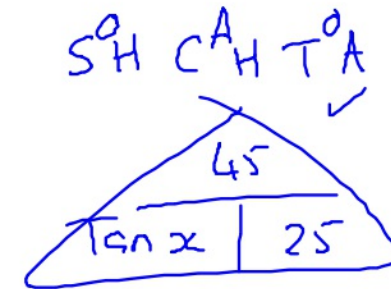
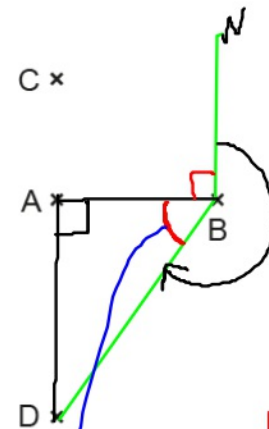
B is 25 kilometres due East of A.

C is 25 kilometres due North of A.

D is 45 kilometres due South of A.

Video created by W Neill

Not to scale



$$\tan x = \frac{45}{25}$$

$$\tan x = 1.8$$

$$x = \tan^{-1} 1.8$$

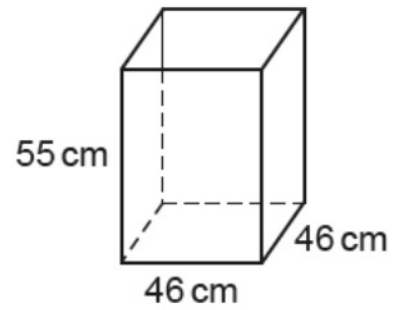
$$\rightarrow x = 60.945^\circ$$

(b) Calculate the bearing of D from B.

$$209.05^\circ \checkmark$$

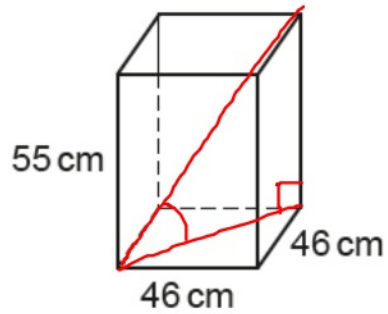
.....° [4]

Video created by W Neill



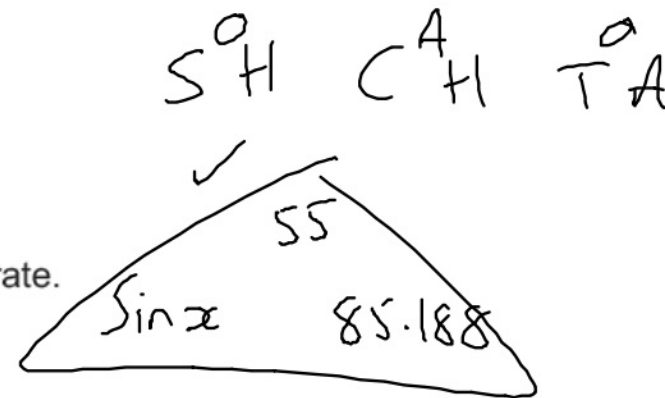
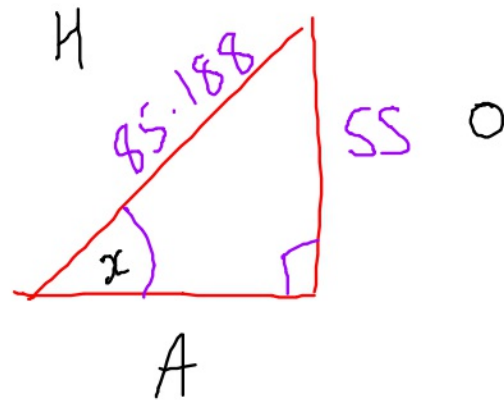
(b) Calculate the angle the stick makes with the base of the crate.

(b) ° [3]



(b) Calculate the angle the stick makes with the base of the crate.

G47
G62



$$\sin x = 0.645\dots$$

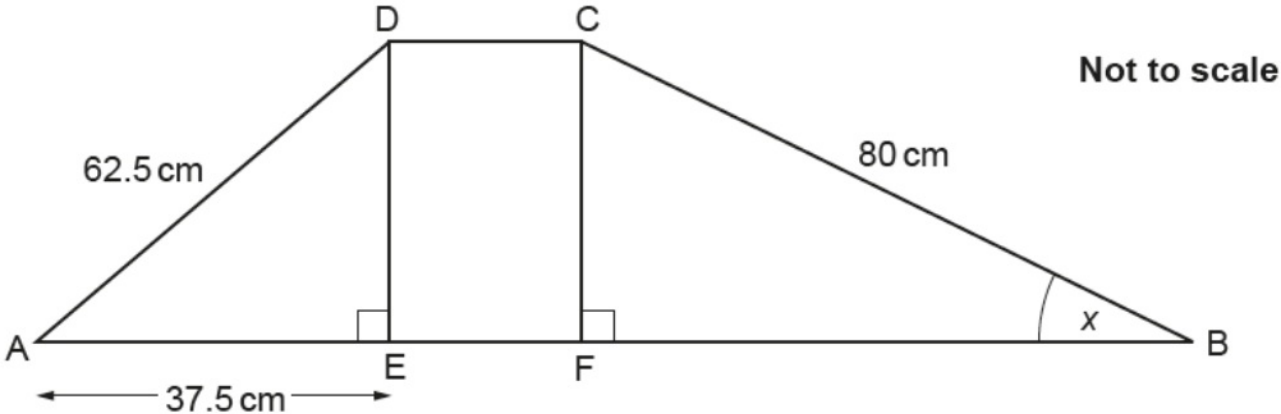
$$x = \sin^{-1} 0.645\dots$$

(b) 40.2° ✓ [3]

Created by W Neill

19 In the diagram below, ABCD is a trapezium.
Length AE is 37.5 cm.
DE = CF

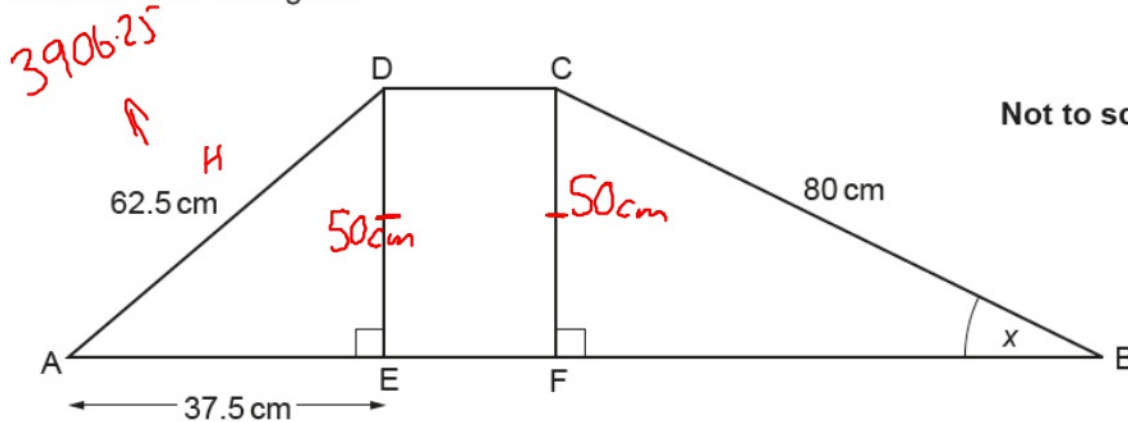
Find the value of angle x.



x = ° [6]

19 In the diagram below, ABCD is a trapezium.
 Length AE is 37.5 cm.
 DE = CF

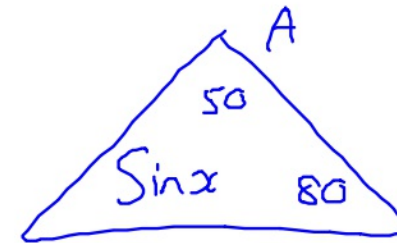
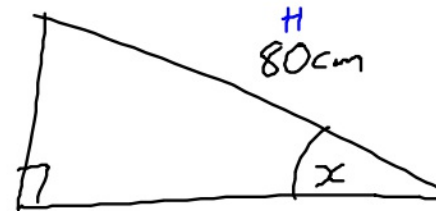
Find the value of angle x.



Created by W Neill

$\sin^{-1} \frac{50}{80}$ $\sin^{-1} \frac{50}{80}$ $\sin^{-1} \frac{50}{80}$

Not to scale \circ
 50cm



$$\sin x = 0.625$$

$$x = \sin^{-1} 0.625$$

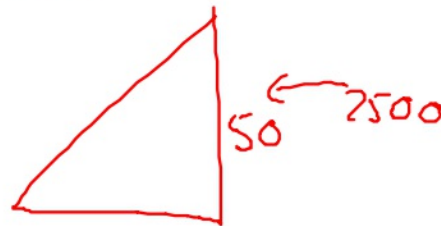
$$38.7^\circ$$

x = $^\circ$ [6]

3906.25

↓
 1406.25

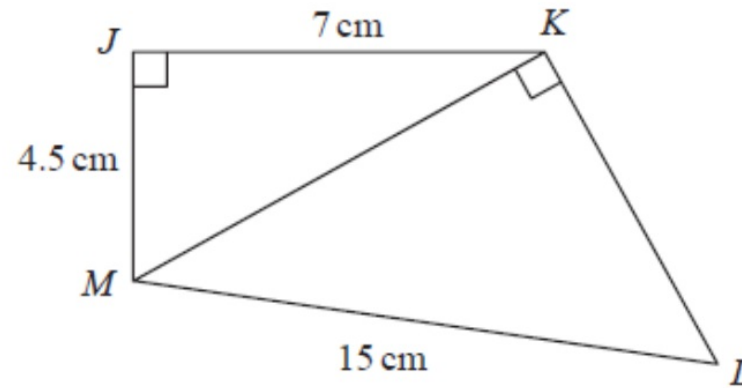
3906.25



1406.25

Edexcel

24 The diagram shows a quadrilateral $JKLM$.

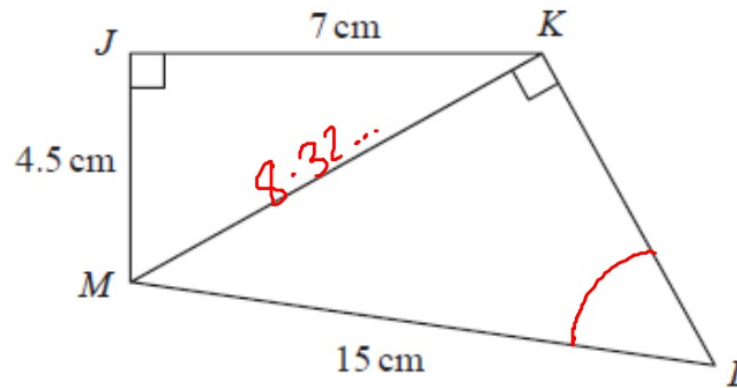


Work out the size of angle KLM .
Give your answer correct to 3 significant figures.

.....
(Total for Question 6 is 4 marks)

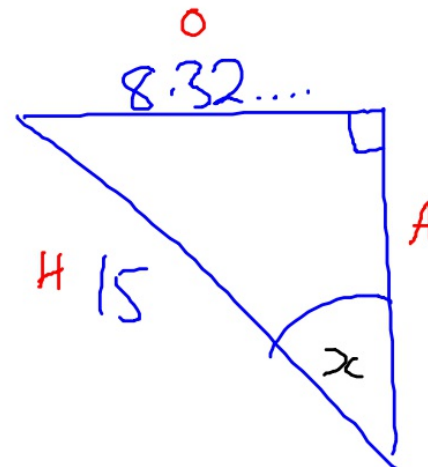
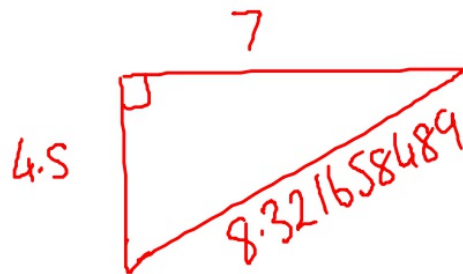
6 The diagram shows a quadrilateral $JKLM$.

Created by W Neill



$S^{\circ}H \quad C^A \quad H \quad T^{\circ}A$
✓

Work out the size of angle KLM .
Give your answer correct to 3 significant figures.



$$\sin x = 0.5547\dots$$

$$x = \sin^{-1} 0.5547$$

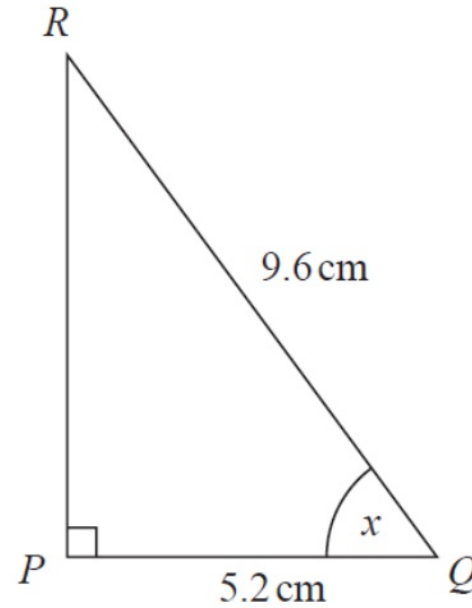
$$x =$$

$$\underline{33.7^{\circ}} \quad \checkmark$$

(Total for Question 6 is 4 marks)

29 PQR is a right-angled triangle.

G47



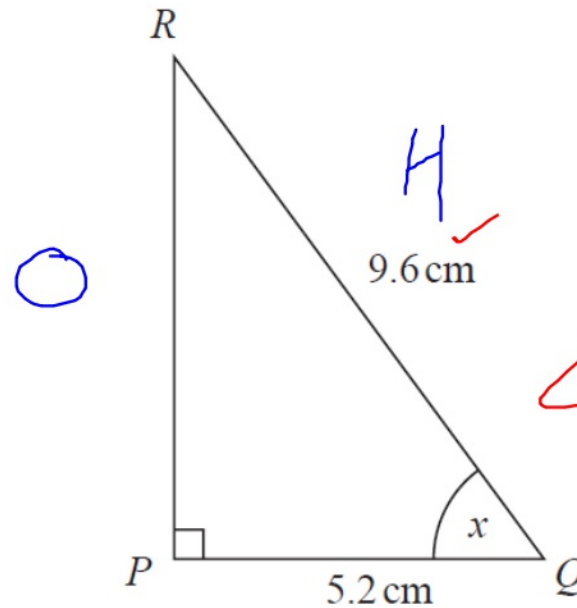
Work out the size of the angle marked x .
Give your answer correct to 1 decimal place.

.....
○

(Total for Question 29 is 2 marks)

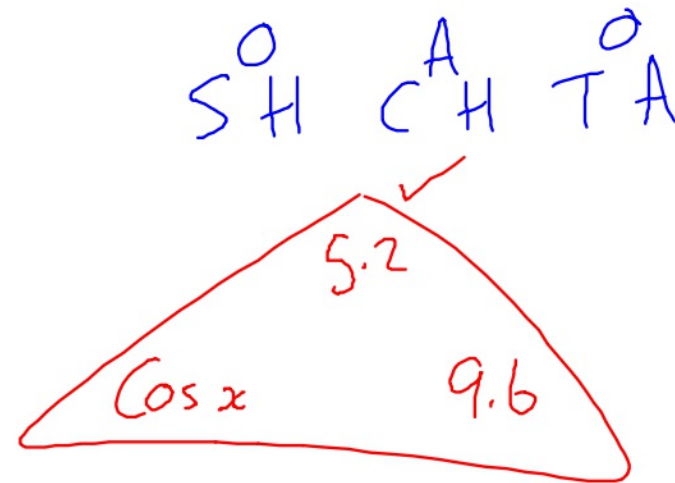
29 PQR is a right-angled triangle.

G47



Work out the size of the angle marked x .
Give your answer correct to 1 decimal place.

A ✓



$$\cos x = \frac{5.2}{9.6}$$

$$\cos x = 0.541\bar{6}$$

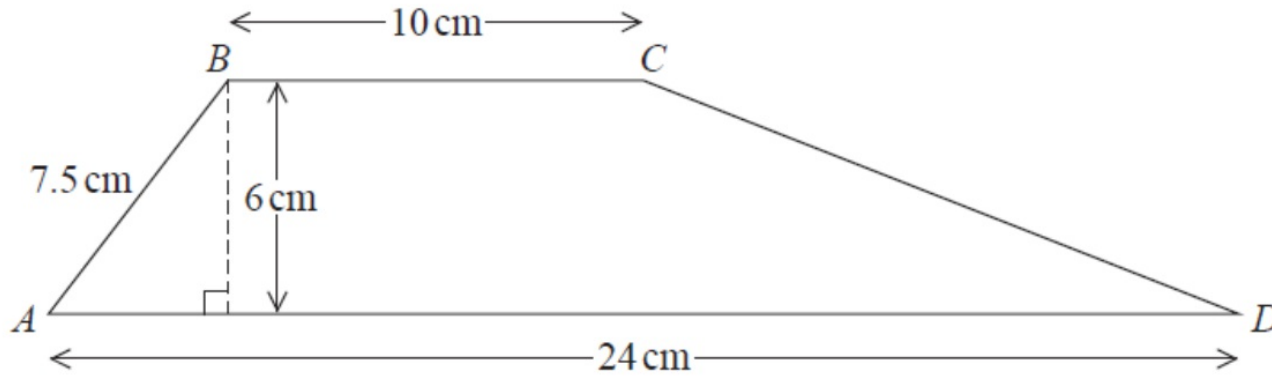
$$x = \cos^{-1} 0.541\bar{6}$$

$$57.2^\circ$$

(Total for Question 29 is 2 marks)

22 $ABCD$ is a trapezium.

Created by W Neill

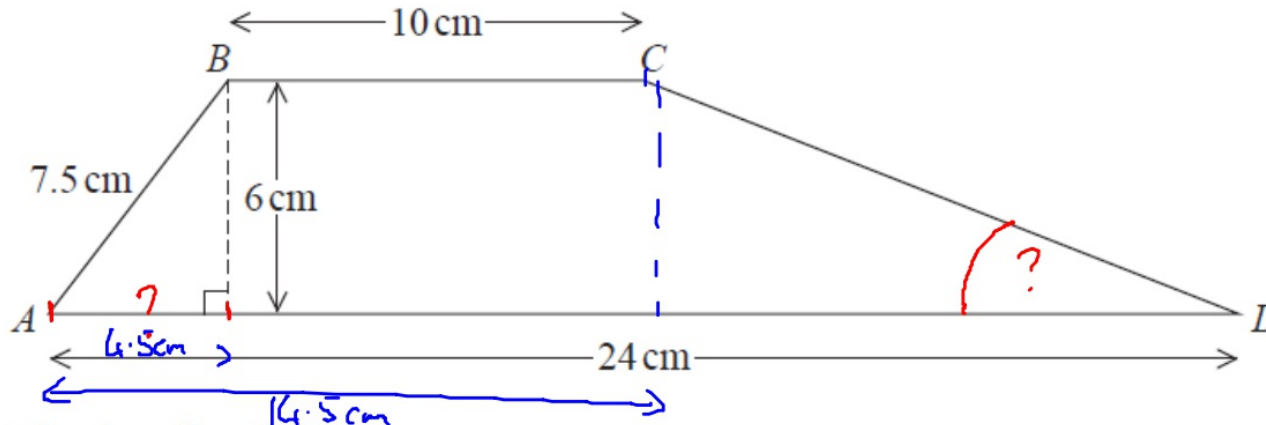


Work out the size of angle CDA .
Give your answer correct to 1 decimal place.

.....
(Total for Question 22 is 5 marks)

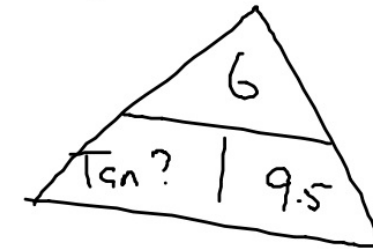
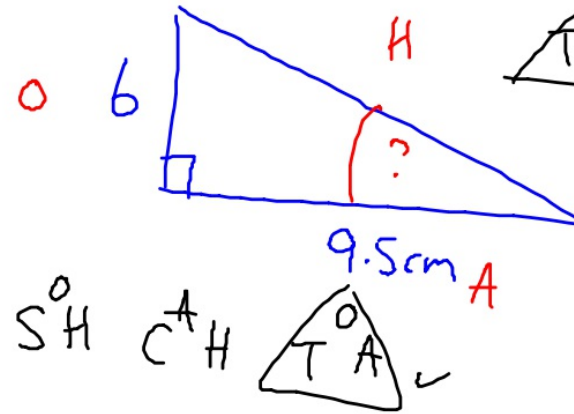
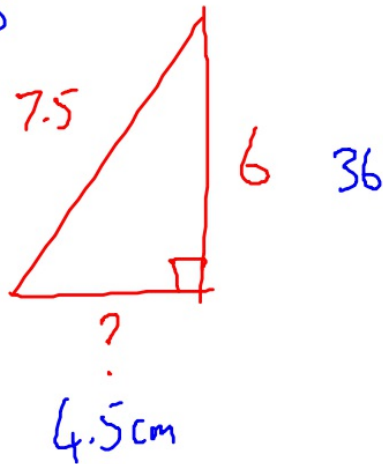
$ABCD$ is a trapezium.

Created by W Neill



Work out the size of angle CDA .
Give your answer correct to 1 decimal place.

56.25



$$\text{Tan?} = 0.63\dots$$

$$? = \text{Tan}^{-1} 0.63$$

$$= 32.3^\circ$$

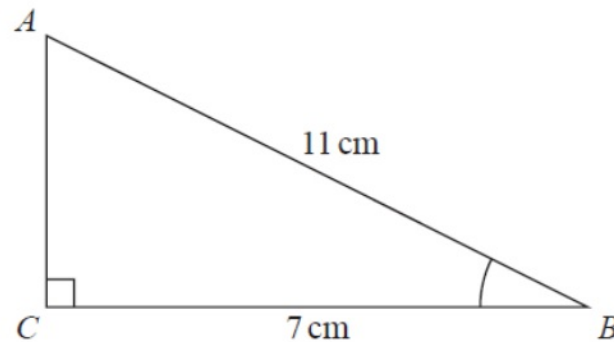
32.3 ✓

(Total for Question . is 5 marks)

23 ABC is a right-angled triangle.

Video created by W Neill

G47



(a) Work out the size of angle ABC .

Give your answer correct to 1 decimal place.

.....
(2)

The length of the side AB is reduced by 1 cm .

The length of the side BC is still 7 cm .

Angle ACB is still 90°

(b) Will the value of $\cos ABC$ increase or decrease?

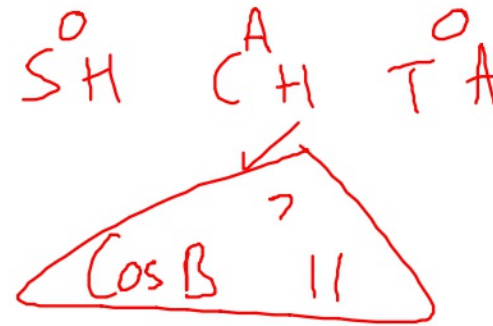
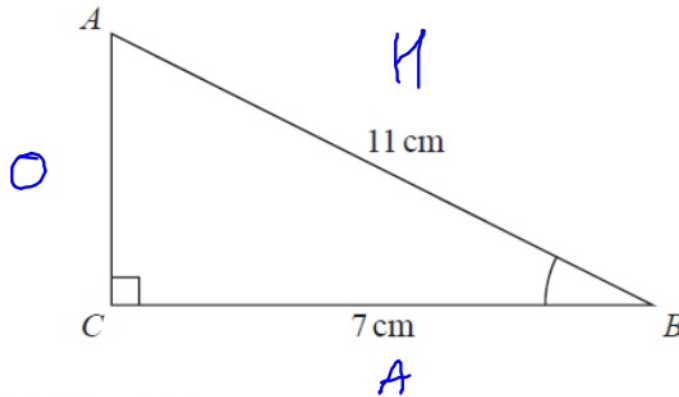
You must give a reason for your answer.

.....
(1)

23 ABC is a right-angled triangle.

Video created by W Neill

G47



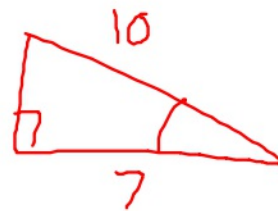
- (a) Work out the size of angle ABC .
Give your answer correct to 1 decimal place.

(2)

$$\begin{aligned} \cos B &= 0.63 \\ B &= \cos^{-1} 0.63 \\ B &= 50.5^\circ \checkmark \end{aligned}$$

The length of the side AB is reduced by 1 cm.

The length of the side BC is still 7 cm.
Angle ACB is still 90°



- (b) Will the value of $\cos ABC$ increase or decrease?
You must give a reason for your answer.

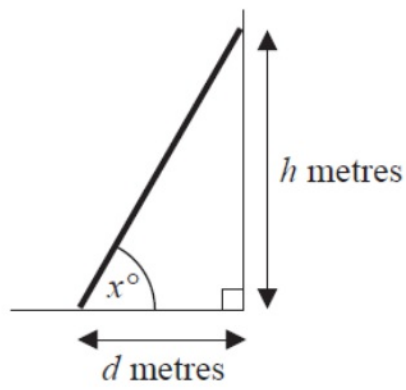
$$\begin{aligned} \text{1st} \rightarrow \cos B &= 0.63 \\ \text{2nd} \rightarrow \cos B &= \frac{7}{10} = 0.7 \end{aligned}$$

it will increase, $0.7 > 0.63$

(1)

- 11 The bottom of a ladder is on horizontal ground.
The top of the ladder is leaning against a vertical wall.

Created by W Neill



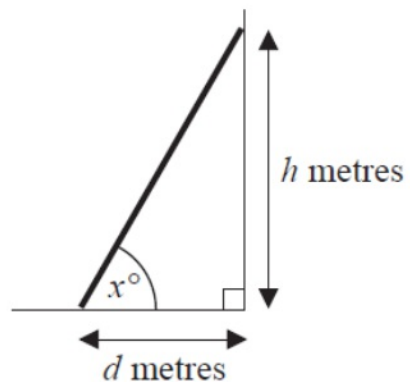
The bottom of the ladder is d metres from the wall.
The top of the ladder is h metres above the ground.
The angle between the ladder and the ground is x°

Some safety instructions say it is safe to climb the ladder when

$$h = 4d$$

- (a) Work out the value of x when $h = 4d$

.....
(3)



Some different safety instructions say the angle between the ladder and the ground should be 75°

The ladder is moved so that $x = 75$

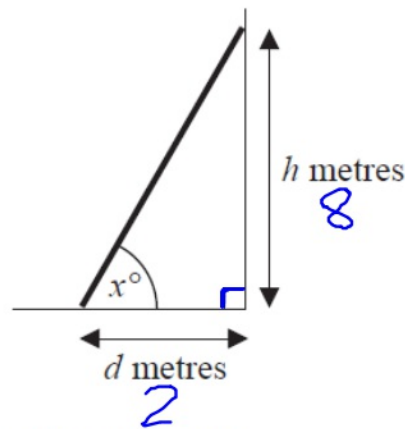
(b) How does this affect the height, h metres, of the top of the ladder above the ground?

(1)

(Total for Question 11 is 4 marks)

- 11 The bottom of a ladder is on horizontal ground.
The top of the ladder is leaning against a vertical wall.

Created by W Neill

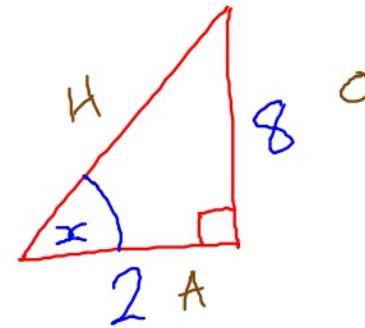


The bottom of the ladder is d metres from the wall.
The top of the ladder is h metres above the ground.
The angle between the ladder and the ground is x°

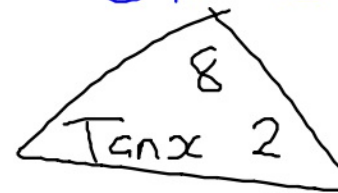
Some safety instructions say it is safe to climb the ladder when

$$h = 4d$$

- (a) Work out the value of x when $h = 4d$



SOH CAH TA

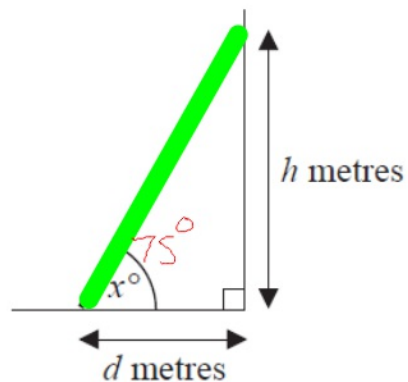


$$\tan x = 4$$

$$x = \tan^{-1} 4$$

$$\underline{\underline{76.0^\circ}}$$

(3)



Some different safety instructions say the angle between the ladder and the ground should be 75°

The ladder is moved so that $x = 75$

(b) How does this affect the height, h metres, of the top of the ladder above the ground?

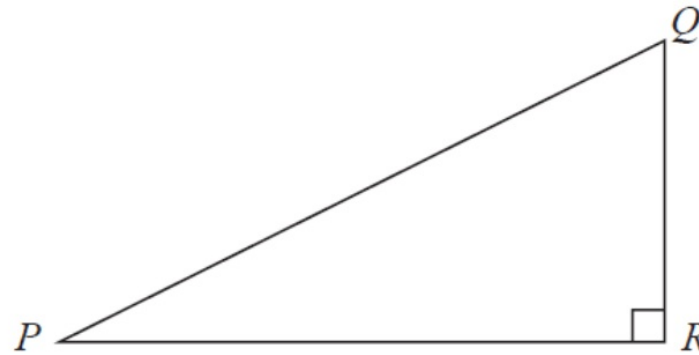
height of ladder will decrease.

(1)

(Total for Question 11 is 4 marks)

12 Here is triangle PQR .

Created by W Neill



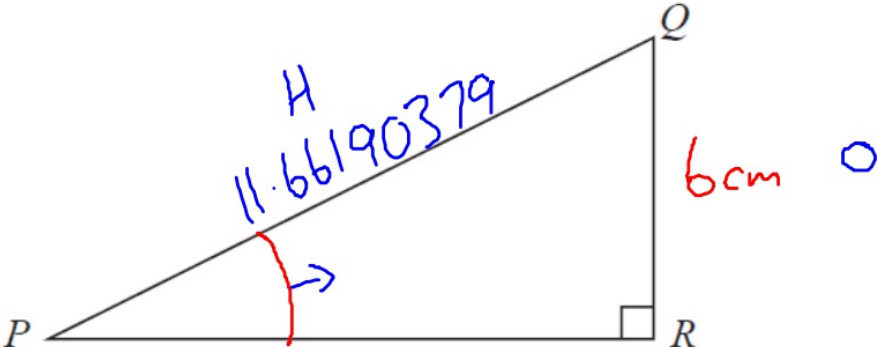
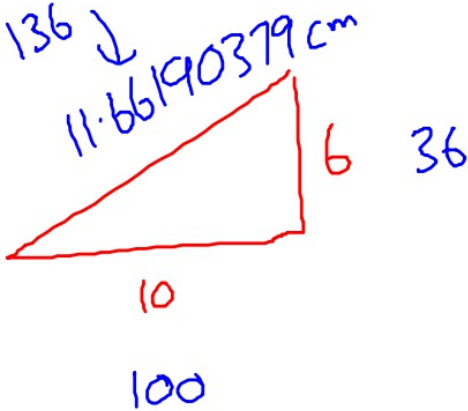
The length of QR is 60% of the length of PR .

Find the value of $\sin QPR$.

Give your answer correct to 3 significant figures.

.....
(Total for Question 12 is 3 marks)

12 Here is triangle PQR.



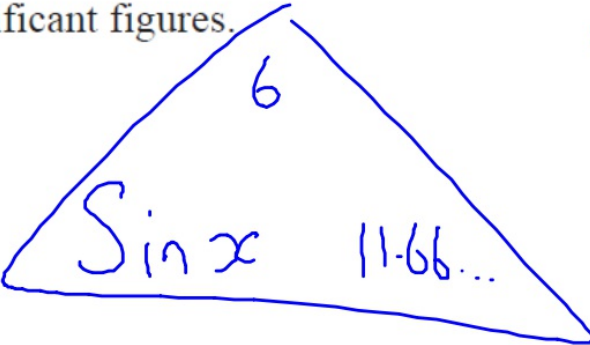
The length of QR is 60% of the length of PR.

Find the value of $\sin QPR$.

Give your answer correct to 3 significant figures.

10cm
A

$\sin x = \frac{6}{11.66...}$
 $\sin x = 0.514$

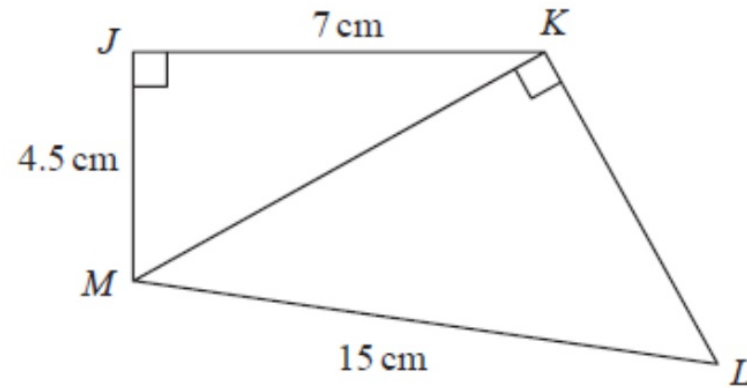


$$\sin x = \frac{6}{11.66...}$$

$$\sin x = 0.514$$

(Total for Question 12 is 3 marks)

6 The diagram shows a quadrilateral $JKLM$.

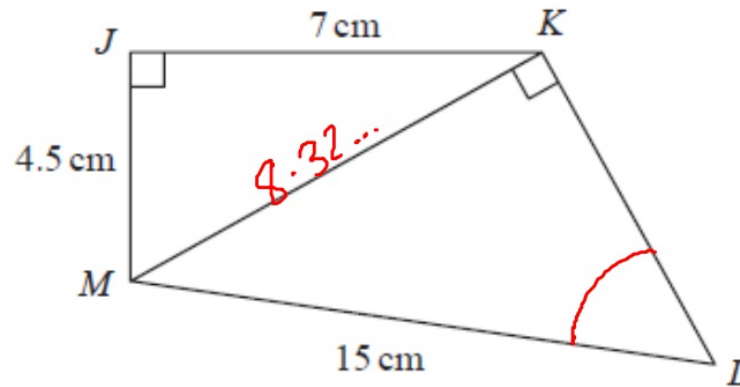


Work out the size of angle KLM .
Give your answer correct to 3 significant figures.

.....
(Total for Question 6 is 4 marks)

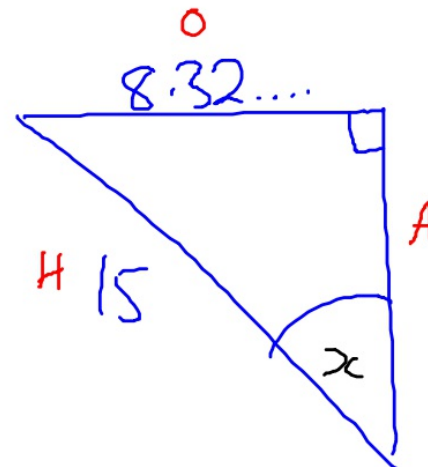
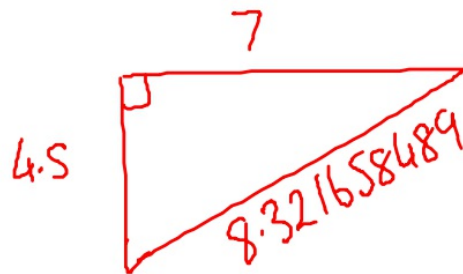
6 The diagram shows a quadrilateral $JKLM$.

Created by W Neill



$S^{\circ}H$ C^A H $T^{\circ}A$
✓

Work out the size of angle KLM .
Give your answer correct to 3 significant figures.



$$\sin x = 0.5547\dots$$

$$x = \sin^{-1} 0.5547$$

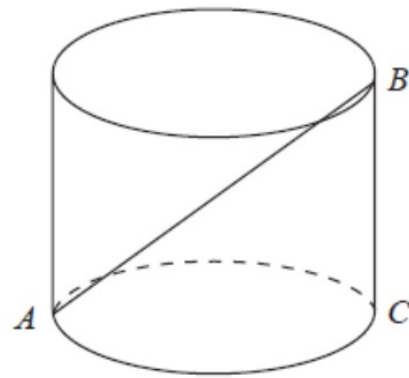
$$x =$$

$$\underline{33.7^{\circ}} \checkmark$$

(Total for Question 6 is 4 marks)

12 The diagram shows a metal rod, AB , resting inside a cylindrical tin.

Created by W Neill



The tin is on a horizontal table.
 AC is a diameter of the base of the tin.
 B is on the top edge of the tin.
 BC is vertical.

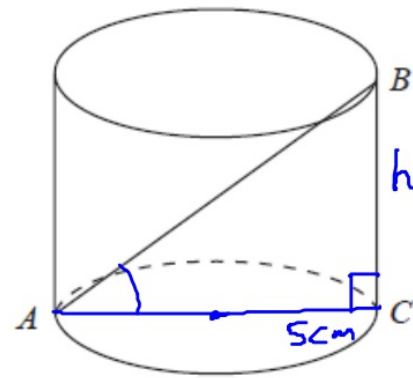
The radius of the base of the tin is 5 cm.
The volume of the tin is 1178 cm^3

Find the angle between the rod and the base of the tin.
Give your answer correct to the nearest degree.

.....
(Total for Question 12 is 4 marks)

12 The diagram shows a metal rod, AB , resting inside a cylindrical tin.

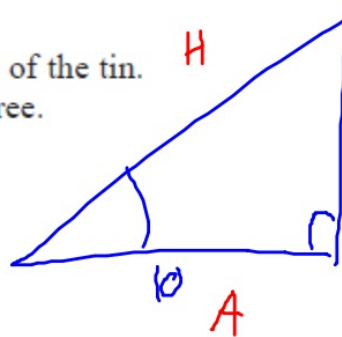
Created by W Neill



The tin is on a horizontal table.
 AC is a diameter of the base of the tin.
 B is on the top edge of the tin.
 BC is vertical.

The radius of the base of the tin is 5 cm.
 The volume of the tin is 1178 cm^3

Find the angle between the rod and the base of the tin.
 Give your answer correct to the nearest degree.



Volume of cylinder

$$\pi r^2 h = 1178$$

$$\pi 5^2 h = 1178$$

$$h = \frac{1178}{\pi 5^2}$$

$$h = 14.99876184 \text{ cm}$$

SHCA TA ✓

$$\tan x = 1.499..$$

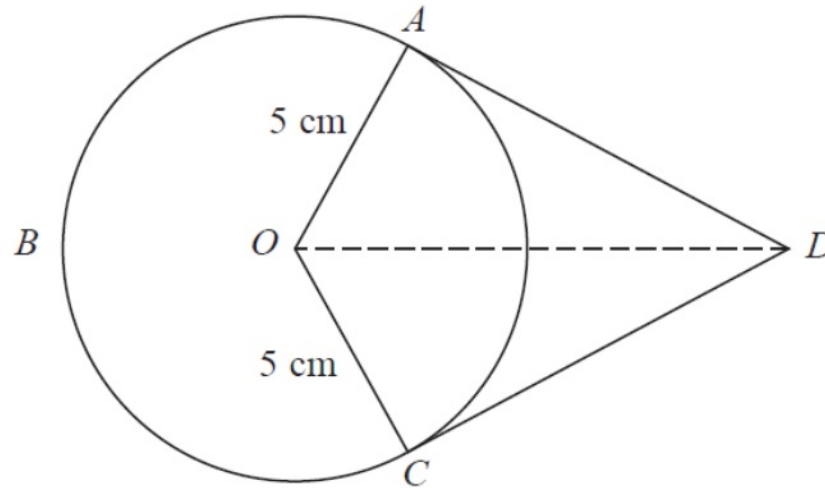
$$x = \tan^{-1} 1.499..$$

$$56^\circ$$

(Total for Question 12 is 4 marks)

18

Video created by W Neill



A , B and C are points on a circle of radius 5 cm, centre O .

DA and DC are tangents to the circle.

$DO = 9$ cm

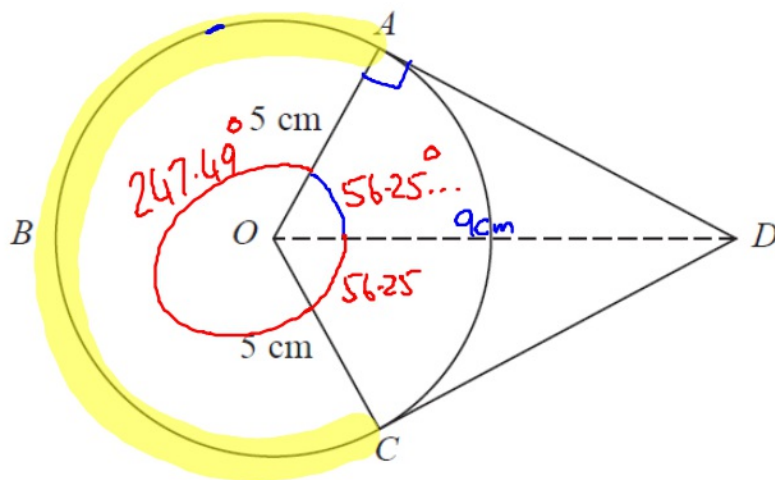
Work out the length of arc ABC .

Give your answer correct to 3 significant figures.

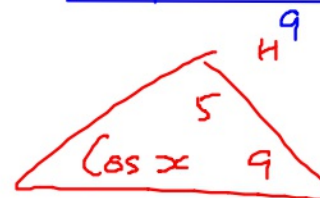
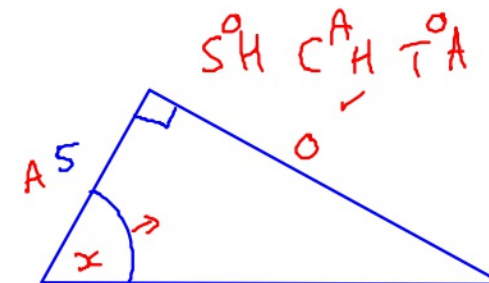
..... cm

(Total for Question 18 is 5 marks)

18



Video created by W Neill



$$\cos x = \frac{5}{9}$$

$$x = \cos^{-1} \frac{5}{9}$$

$$x = 56.25\dots$$

A , B and C are points on a circle of radius 5 cm, centre O .

DA and DC are tangents to the circle.

$DO = 9$ cm

Work out the length of arc ABC .

Give your answer correct to 3 significant figures.

$$\text{full circle} = D \times \pi$$

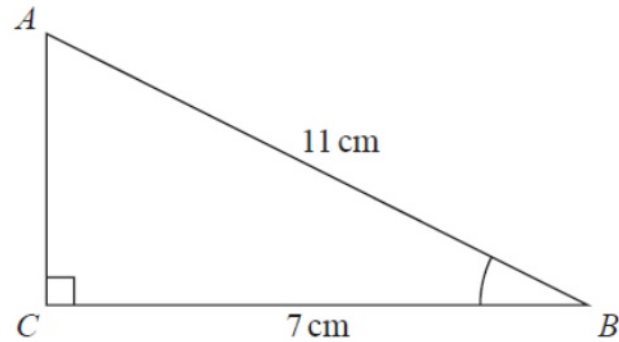
$$10 \times \pi \div 360^\circ \times 247.4979772$$

..... 21.6 ✓ cm

(Total for Question 18 is 5 marks)

5 ABC is a right-angled triangle.

Video created by W Neill



(a) Work out the size of angle ABC .

Give your answer correct to 1 decimal place.

.....
(2)

The length of the side AB is reduced by 1 cm .

The length of the side BC is still 7 cm .

Angle ACB is still 90°

(b) Will the value of $\cos ABC$ increase or decrease?

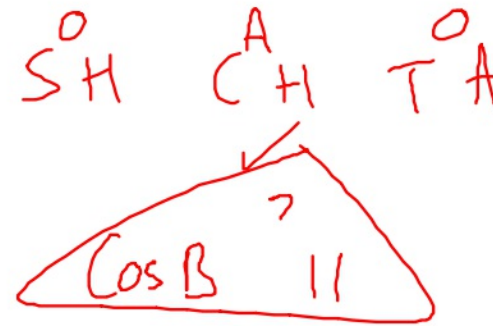
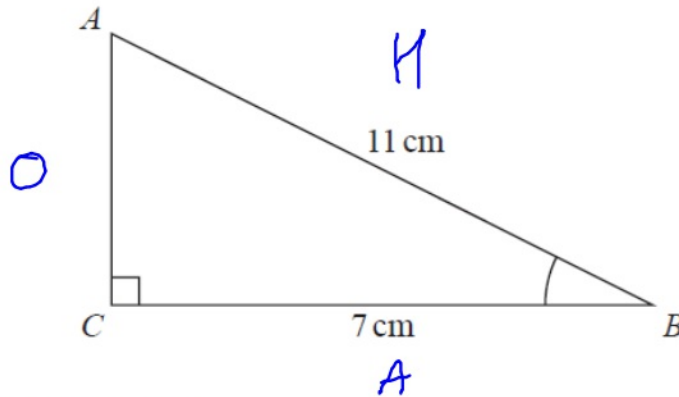
You must give a reason for your answer.

.....
(1)

5 ABC is a right-angled triangle.

Video created by W Neill

G47



$$\cos B = 0.63$$

$$B = \cos^{-1} 0.63$$

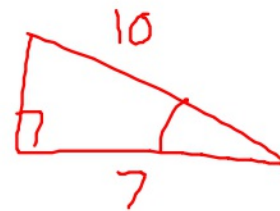
$$B = 50.5^\circ \checkmark$$

- (a) Work out the size of angle ABC .
Give your answer correct to 1 decimal place.

(2)

The length of the side AB is reduced by 1 cm.

The length of the side BC is still 7 cm.
Angle ACB is still 90°



- (b) Will the value of $\cos ABC$ increase or decrease?
You must give a reason for your answer.

1st $\rightarrow \cos B = 0.63$

2nd $\rightarrow \cos B = \frac{7}{10} = 0.7$

it will increase, $0.7 > 0.63$

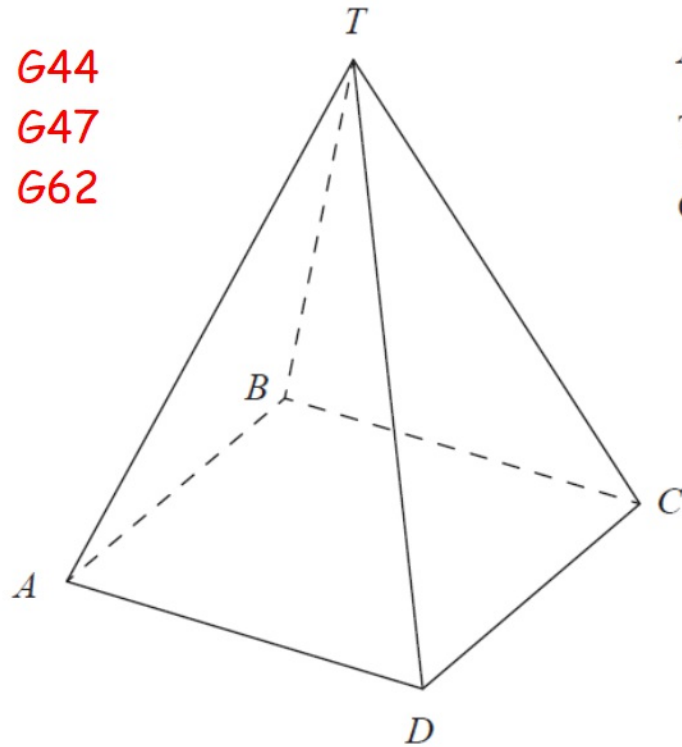
(1)

12 Here is a pyramid with a square base $ABCD$.

G44

G47

G62



$$AB = 5 \text{ m}$$

The vertex T is 12 m vertically above the midpoint of AC .

Calculate the size of angle TAC .

12 Here is a pyramid with a square base $ABCD$.

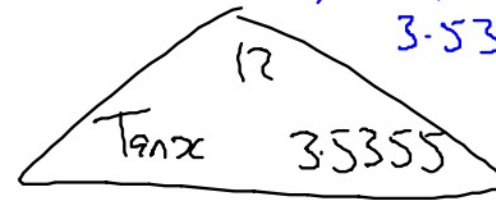
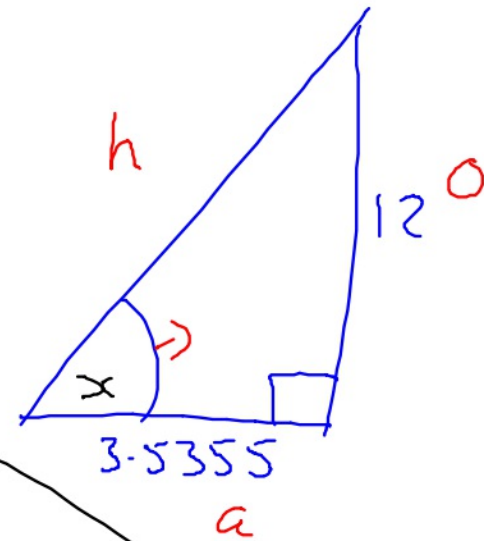
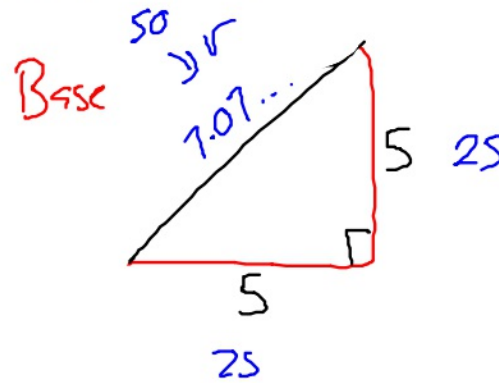
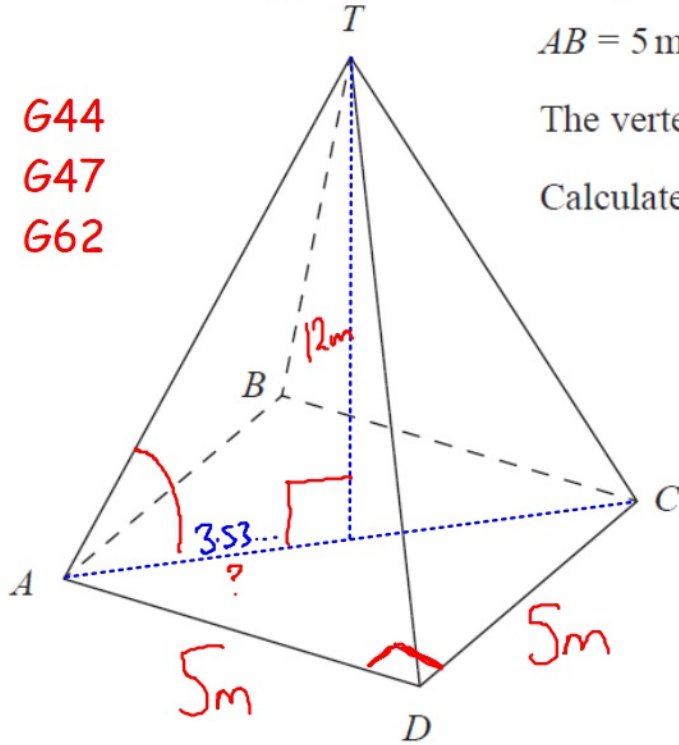
$AB = 5\text{ m}$

The vertex T is 12 m vertically above the midpoint of AC .

Calculate the size of angle TAC .

SOH CAHTOA ✓

G44
G47
G62



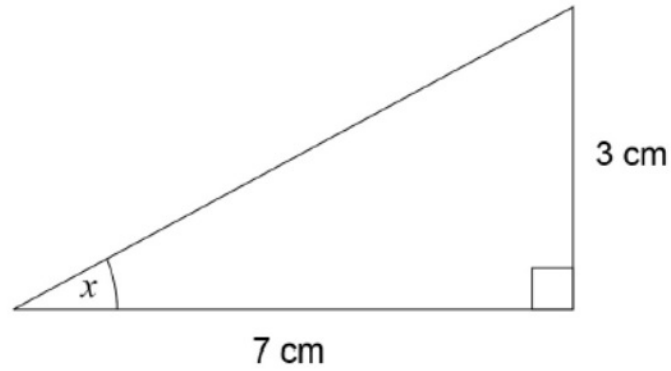
$\tan x = 3.394$ 73.6° ✓
 $x = \tan^{-1} 3.394$

AQA

29 Work out the size of angle x .

G47

Not drawn
accurately



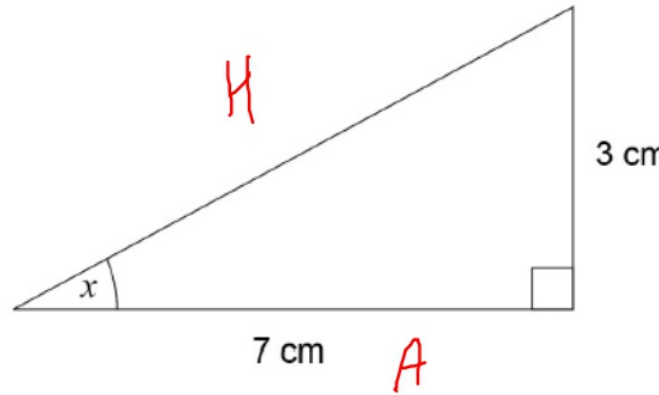
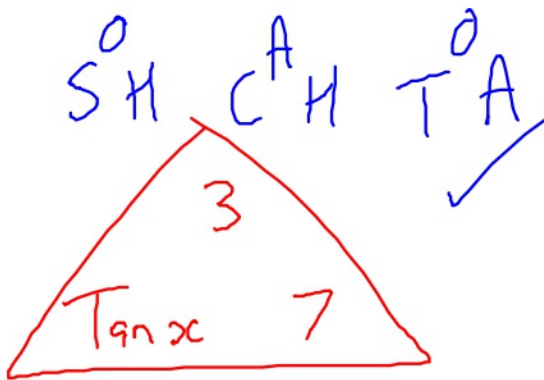
[2 marks]

Answer _____ degrees

Work out the size of angle x .

G47

Not drawn accurately



[2 marks]

$$\tan x = \frac{3}{7}$$

$$\tan x = 0.428\dots$$

$$x = \tan^{-1} 0.428\dots$$

Answer

23.2 ✓

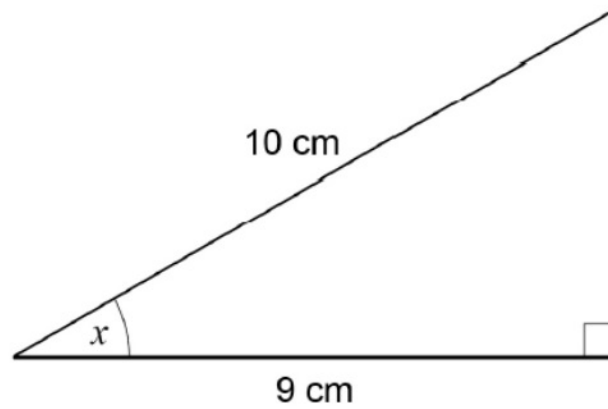
degrees

29

Use trigonometry to work out the size of angle x .

G47

[2 marks]



Not drawn
accurately

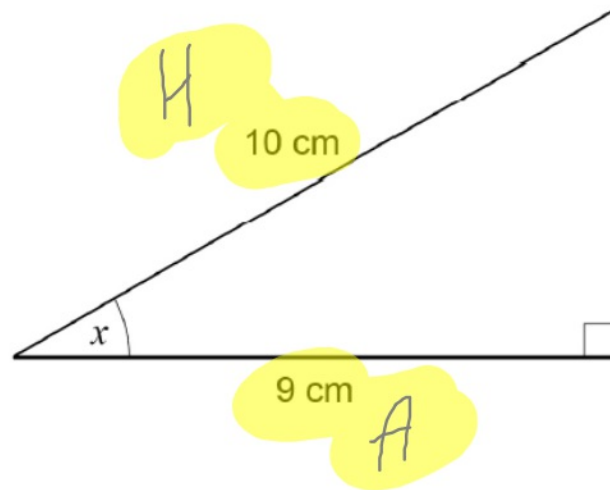
Answer _____ degrees

29

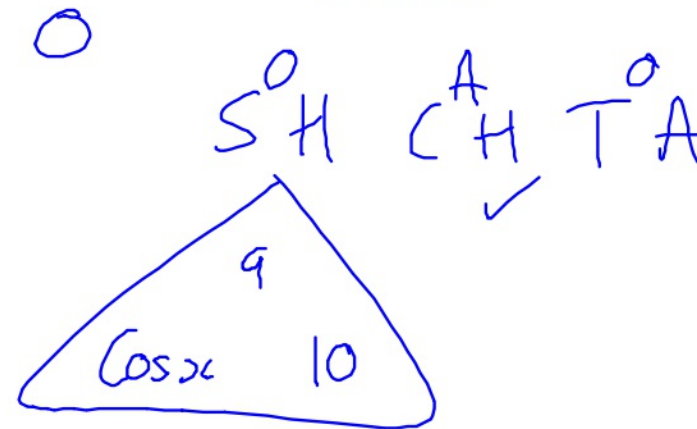
Use trigonometry to work out the size of angle x .

G47

[2 marks]



Not drawn accurately



$$\cos x = 0.9$$

$$x = \cos^{-1} 0.9$$

$$25.8'$$

Answer _____ degrees

