IGCSE · Cambridge (CIE) · Maths

2 hours 36 questions

Calculator Questions

Right-Angled Triangles (Pythagoras & Trigonometry)

Pythagoras Theorem / SOHCAHTOA / Angles of Elevation & Depression / Exact Trig Values

Medium (18 questions)	/63
Hard (9 questions)	/30
Very Hard (9 questions)	/35
Total Marks	**/128**

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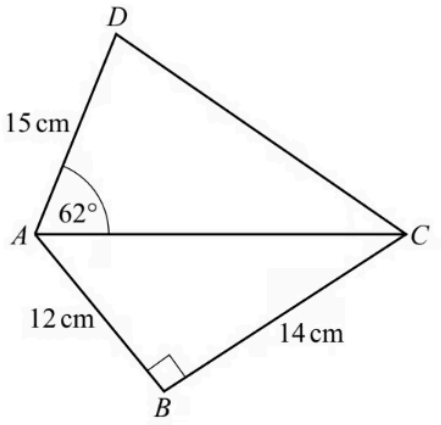
Medium Questions

1 (a)



NOT TO SCALE

The diagram shows a quadrilateral, $ABCD$, formed from two triangles, ABC and ACD.

ABC is a right-angled triangle.

Calculate angle BAC.

Angle BAC = ...

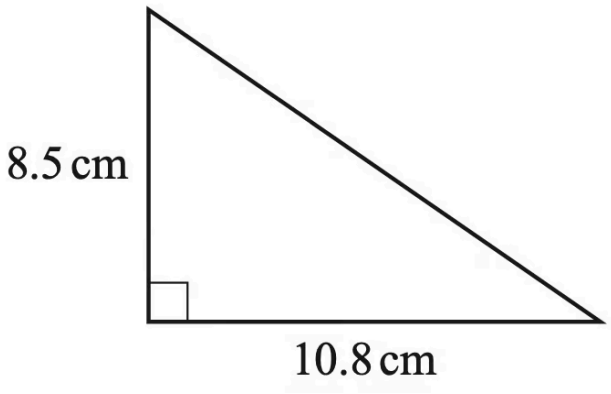
(2 marks)

(b) Calculate the shortest distance from D to AC.

..... cm

(3 marks)

2



NOT TO SCALE

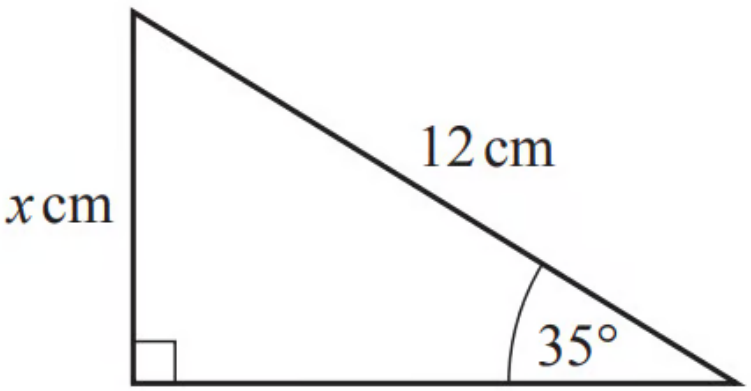
The diagram shows a right-angled triangle.

Calculate the perimeter.

..... cm

(3 marks)

3



NOT TO SCALE

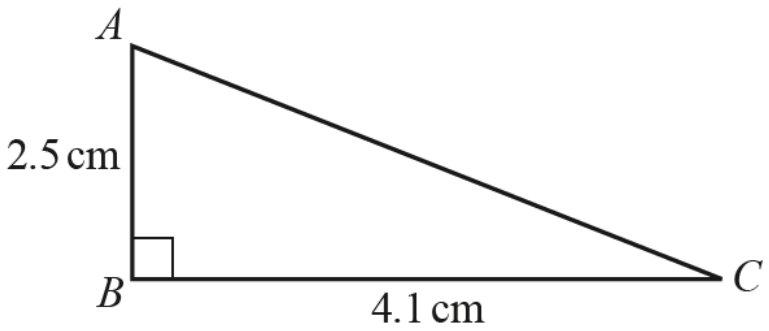
The diagram shows a right-angled triangle.

Calculate the value of x.

x = ...

(2 marks)

4

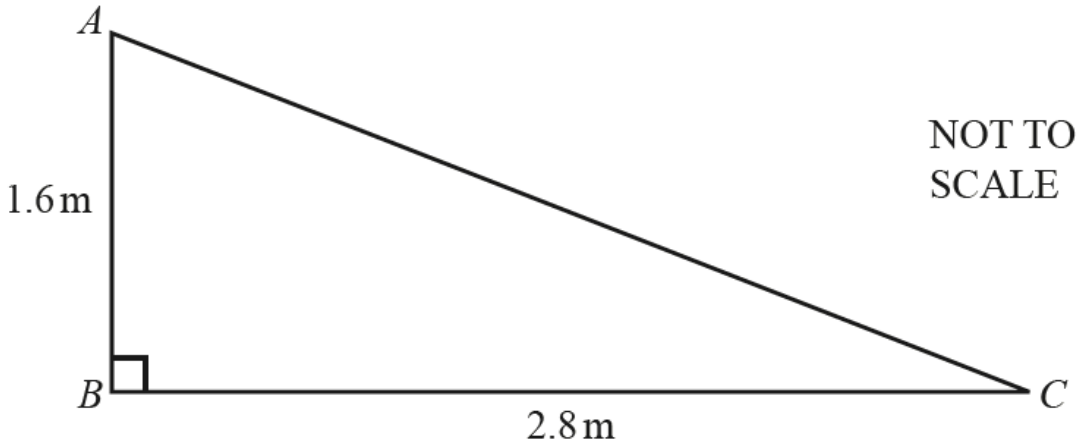


Calculate the length of *AC*.

AC = ... cm

(2 marks)

5



Calculate *AC*.

AC = ... m

(2 marks)

6 Here is a right-angled triangle.

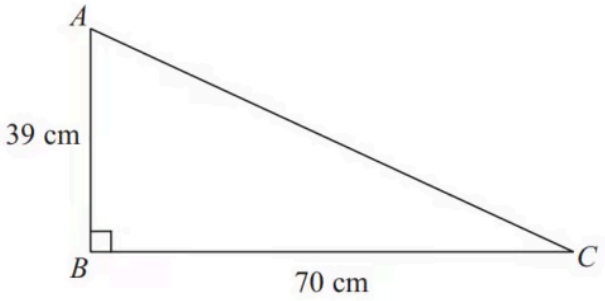


Diagram **NOT** accurately drawn

Work out the length of AC. Give your answer correct to 1 decimal place.

(3 marks)

7

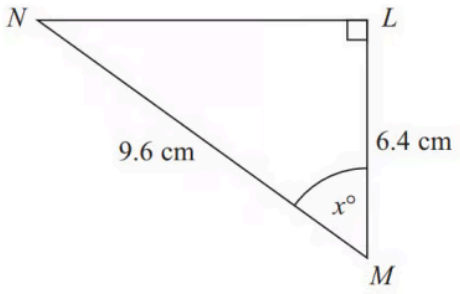


Diagram **NOT** accurately drawn

LMN is a right-angled triangle.

MN = 9.6 cm.

LM= 6.4 cm.

Calculate the size of the angle marked $x°$.

Give your answer correct to 1 decimal place.

(3 marks)

8

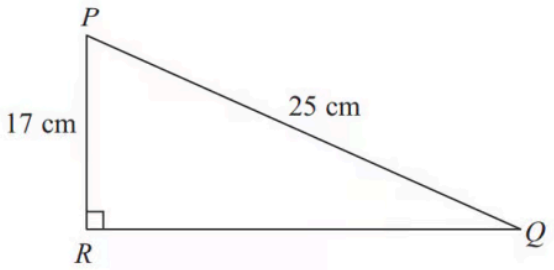


Diagram **NOT** accurately drawn

PQR is a right-angled triangle.

PR = 17 cm

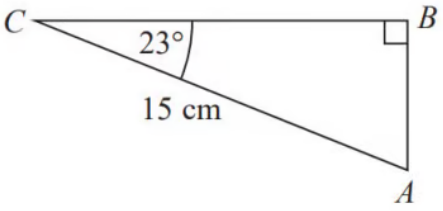
PQ = 25 cm

Work out the size of angle RPQ.

Give your answer correct to 1 decimal place.

(3 marks)

9 ABC is a right-angled triangle.

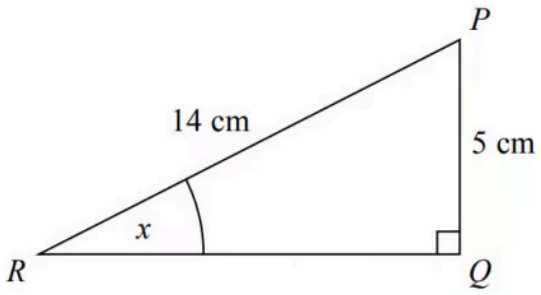


Calculate the length of AB.

Give your answer correct to 3 significant figures.

(2 marks)

10 PQR is a right-angled triangle.

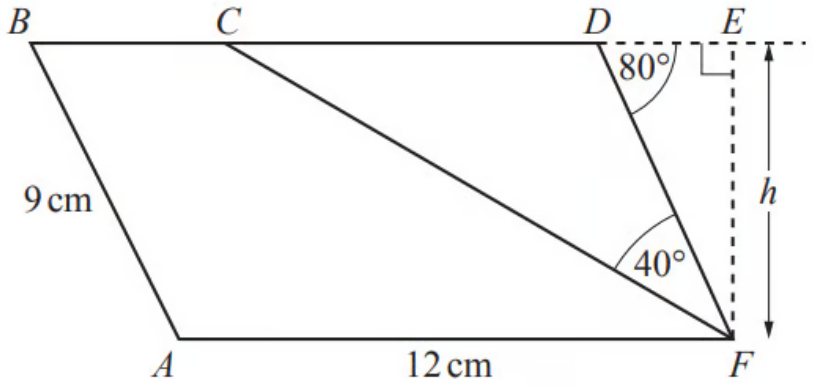


Work out the size of the angle marked x.

Give your answer correct to 1 decimal place.

(2 marks)

11



NOT TO SCALE

ABDF is a parallelogram and *BCDE* is a straight line.

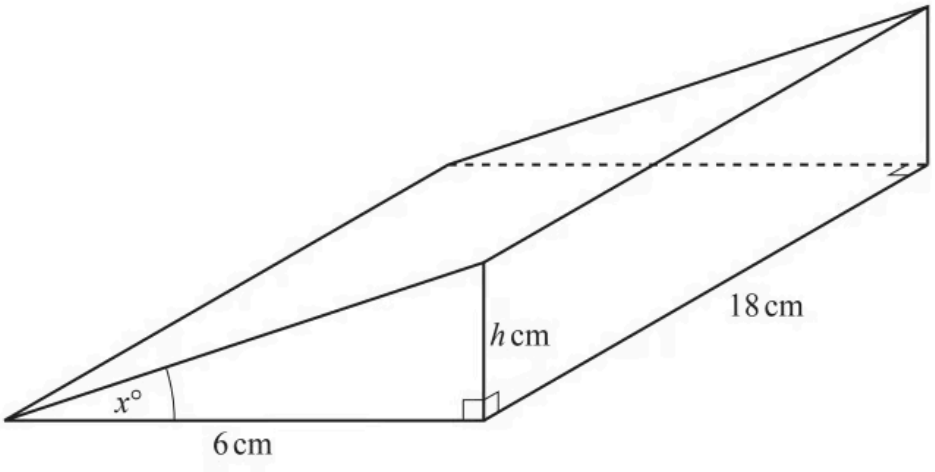
AF = 12cm, *AB* = 9 cm, angle *CFD* = 40° and angle *FDE* = 80°.

Calculate the height, h, of the parallelogram.

h = ... cm

(2 marks)

12 (a)



The diagram shows a prism with length 18 cm and volume 253.8 cm^3.

The cross-section of the prism is a right-angled triangle with base 6 cm and height h cm.

Show that the value of h is 4.7 .

(3 marks)

(b) Calculate the value of x.

x = ...

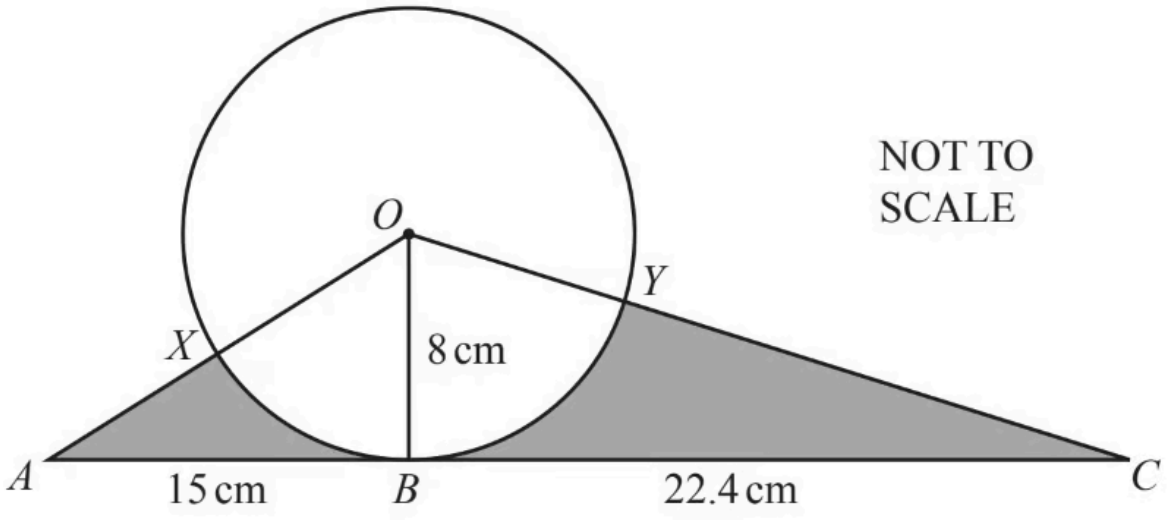
(2 marks)

(c) Calculate the total surface area of the prism.

..... cm^2

(6 marks)

13



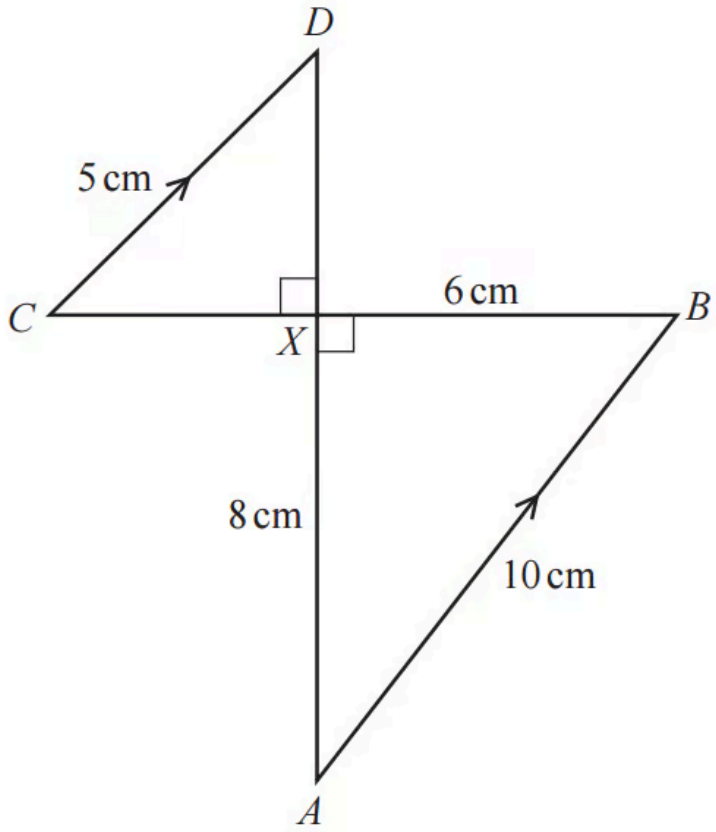
The diagram shows a circle, centre *O*.
The straight line *ABC* is a tangent to the circle at *B*.
OB = 8 cm, *AB* = 15 cm and *BC* = 22.4 cm.
AO crosses the circle at *X* and *OC* crosses the circle at *Y*.

Calculate angle *XOY*.

Angle *XOY* = ...

(5 marks)

14



NOT TO SCALE

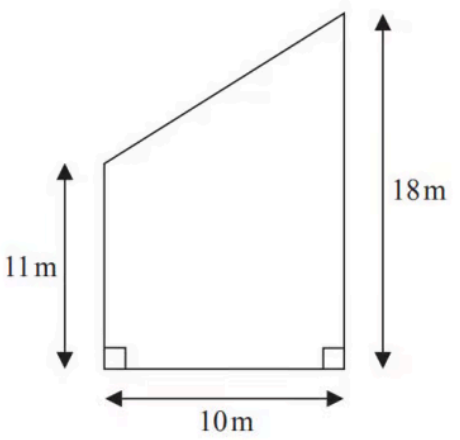
In the diagram, *AB* and *CD* are parallel.
AD and *BC* intersect at right angles at the point *X*.
AB = 10 cm, *CD* = 5 cm, *AX* = 8 cm and *BX* = 6 cm.

Calculate angle *XAB.*

Angle *XAB* = ...

(2 marks)

15 Here is part of a field.



This part of the field is in the shape of a trapezium.

A farmer wants to put a fence all the way around the edge of this part of the field.

The farmer has 50m of fence.

Does he have enough fence? You must show all your working.

(5 marks)

16 The diagram shows a rectangular framework.

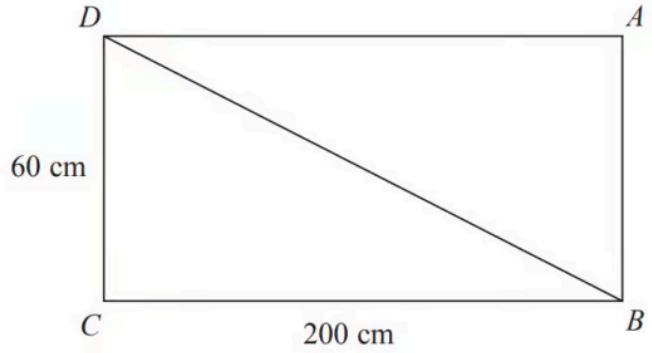


Diagram **NOT** accurately drawn

The framework is made from 5 metal rods.

The metal rods have a weight of 0.9 kg per metre.

Work out the total weight of the framework.

Give your answer, in kg, correct to 3 significant figures.

(4 marks)

17 The diagram shows a rectangle and a diagonal of the rectangle.

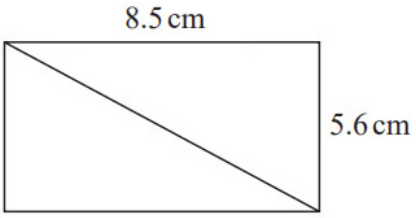


Diagram **NOT** accurately drawn

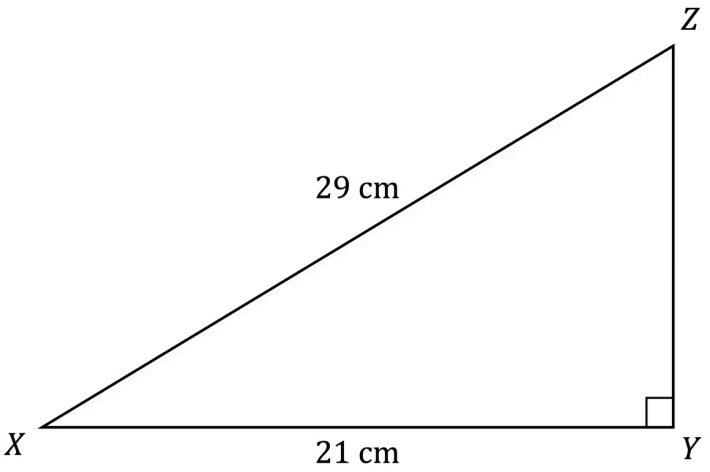
Work out the length of the diagonal of the rectangle.

Give your answer correct to 1 decimal place.

.....cm

(3 marks)

18 (a)



Calculate the value of the length YZ.

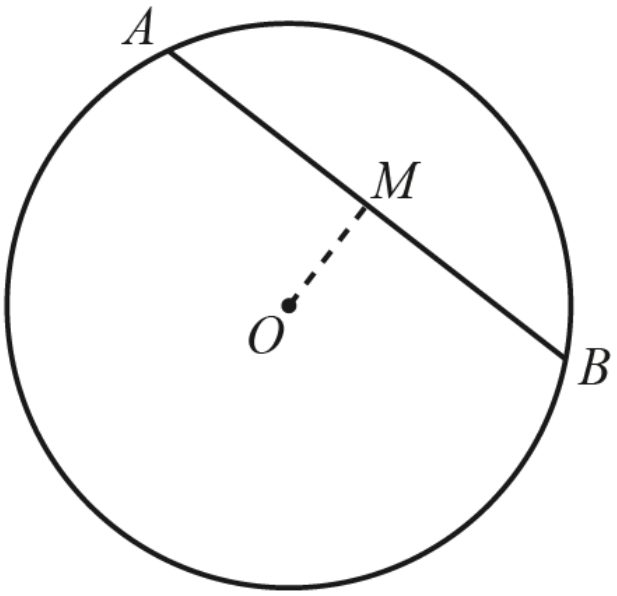
(2 marks)

(b) Find the interior angle at X.

(2 marks)

Hard Questions

1



NOT TO SCALE

The diagram shows a circle, centre *O*.

AB is a chord of length 12 cm.

M is the mid-point of *AB* and *OM* = 4.5 cm.

Calculate the radius of the circle.

..... cm

(3 marks)

2 ABC is an isosceles triangle.

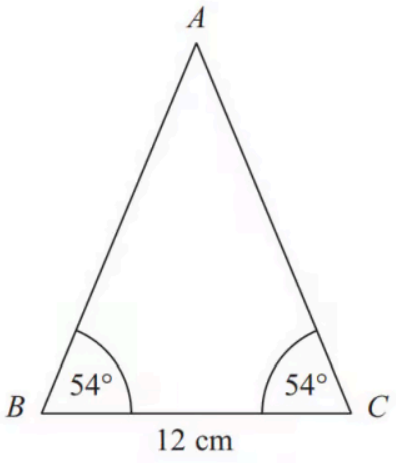


Diagram **NOT** accurately drawn

Work out the area of the triangle.

Give your answer correct to 3 significant figures.

(4 marks)

3

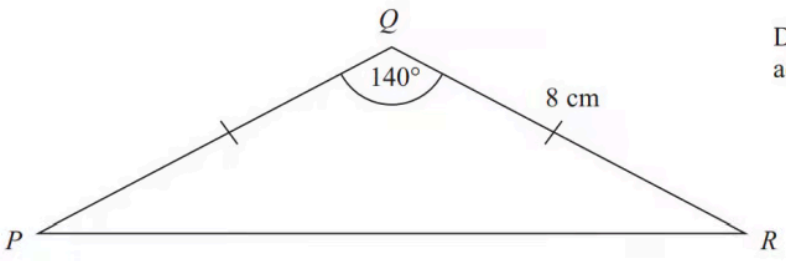


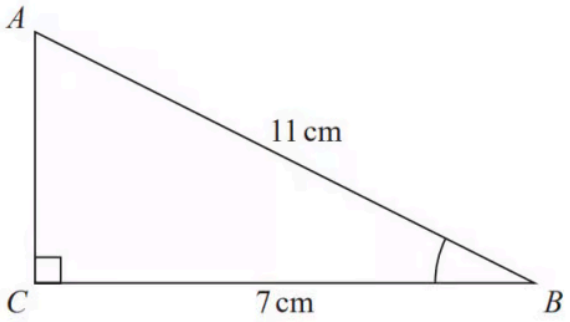
Diagram **NOT** accurately drawn

Calculate the length of PR.

Give your answer correct to 3 significant figures.

(3 marks)

4 (a) ABC is a right-angled triangle.



Work out the size of angle ABC.

Give your answer correct to 1 decimal place.

(2 marks)

(b) 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°

Will the value of cos ABC increase or decrease?

You must give a reason for your answer.

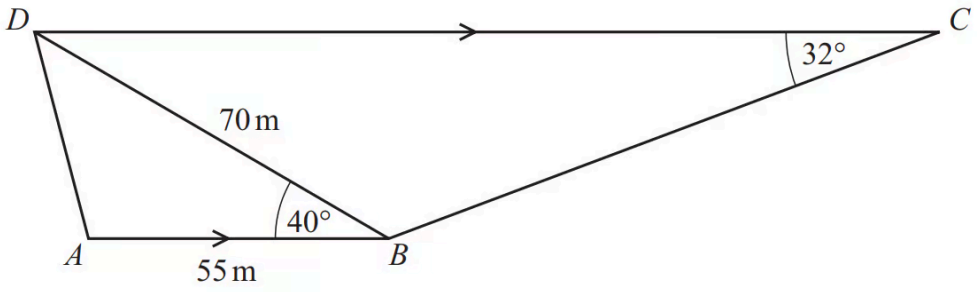
(1 mark)

5 A solid metal cone has radius 1.65 cm and slant height 4.70 cm.

Find the angle the slant height makes with the base of the cone.

(2 marks)

6



NOT TO SCALE

The diagram shows a trapezium $ABCD$.

AB is parallel to DC.

$AB = 55$ m, $BD = 70$ m, angle $ABD = 40°$ and angle $BCD = 32°$.

Calculate the shortest distance from A to BD.

..... m

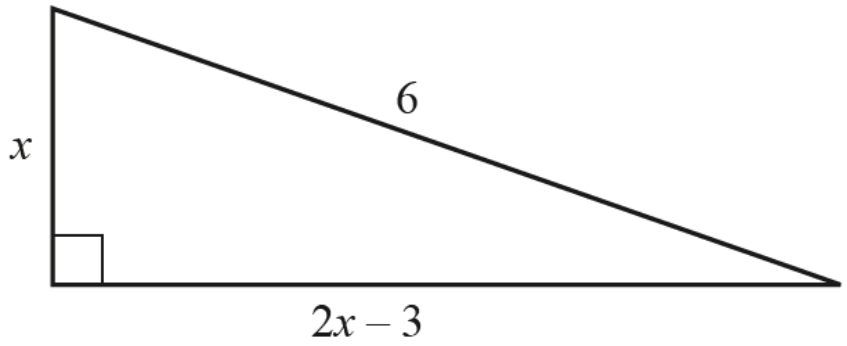
(2 marks)

7 The straight line AC has equation $y = 4x + 5$.

Calculate the acute angle between AC and the x-axis.

(2 marks)

8 In this question, all measurements are in metres.



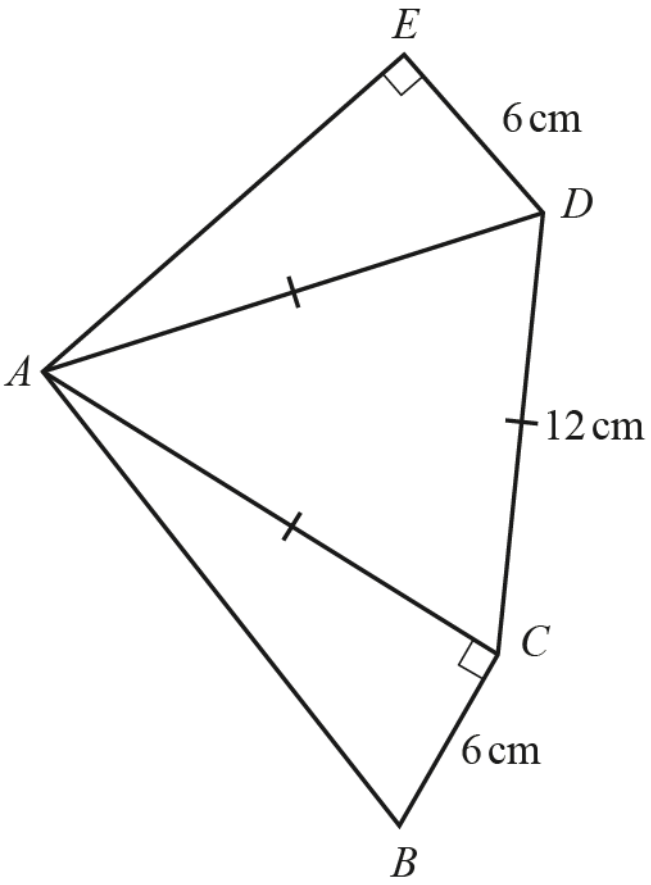
NOT TO SCALE

The diagram shows a right-angled triangle.

Given that $x = 3.82$ to 3 significant figures, calculate the smallest angle of the triangle.

(2 marks)

9 (a)



NOT TO SCALE

In the pentagon $ABCDE$, angle ACB = angle AED = 90°. Triangle ACD is equilateral with side length 12 cm.

DE = BC = 6 cm.

Calculate angle BAE.

Angle BAE = ...

(4 marks)

(b) Calculate AB.

AB = ... cm

(2 marks)

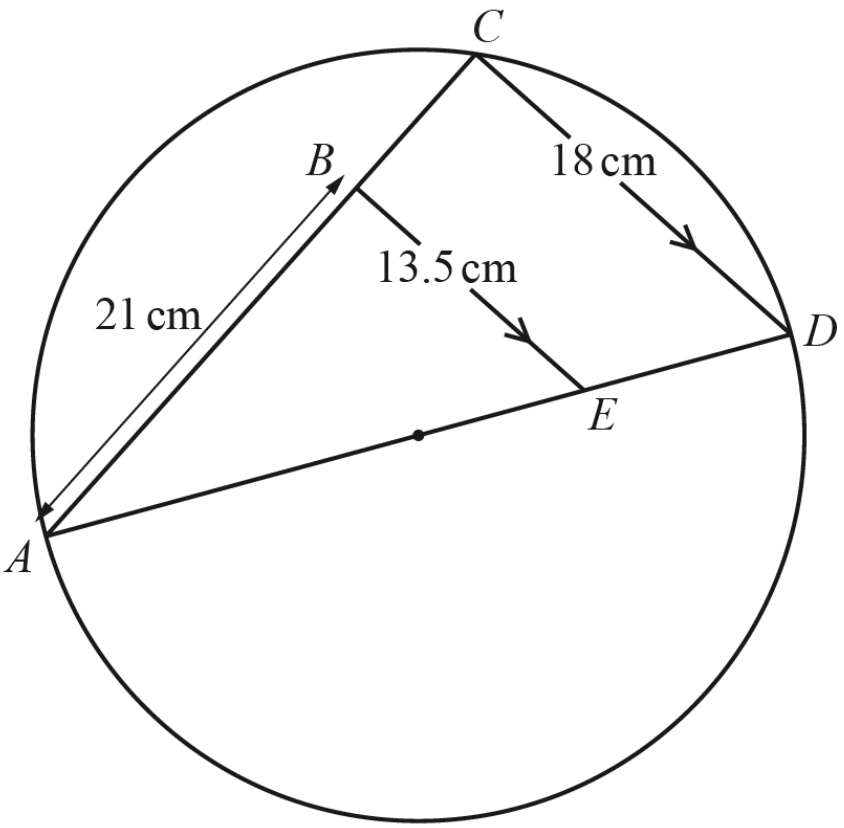
(c) Calculate AE.

AE = ... cm

(3 marks)

Very Hard Questions

1



NOT TO SCALE

C lies on a circle with diameter AD.

B lies on AC and E lies on AD such that BE is parallel to CD.

AB = 21 cm, CD = 18 cm and BE = 13.5 cm.

Work out the radius of the circle.

..... cm

(5 marks)

2 Point *A* has co-ordinates (1, 0) and point *B* has co-ordinates (2, 5).

Calculate the angle between the line *AB* and the x-axis.

(3 marks)

3 A square, with sides of length x cm, is inside a circle. Each vertex of the square is on the circumference of the circle.

The area of the circle is 49 cm^2.

Work out the value of x.

Give your answer correct to 3 significant figures.

(4 marks)

4 Here is triangle ABD.

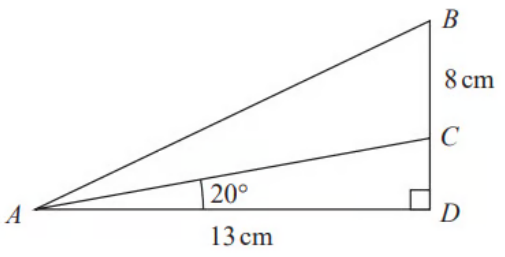


Diagram **NOT** accurately drawn

The point C lies on BD.

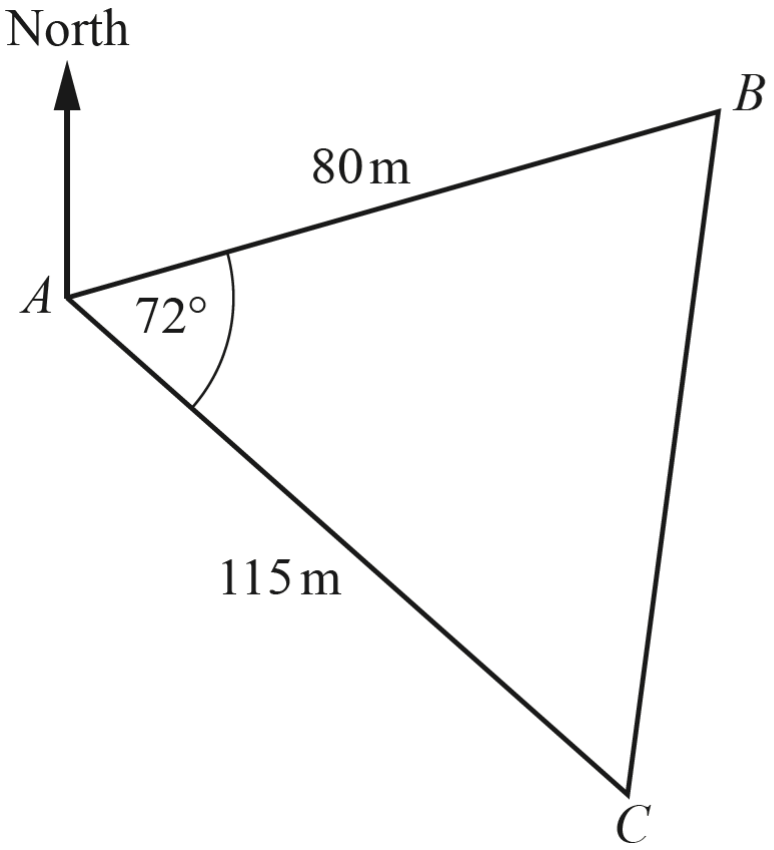
$AD = 13\text{cm}$ $BC = 8\text{cm}$ angle $ADB = 90°$ angle $CAD = 20°$

Calculate the size of angle BAC.

Give your answer correct to 1 decimal place.

(5 marks)

5



NOT TO SCALE

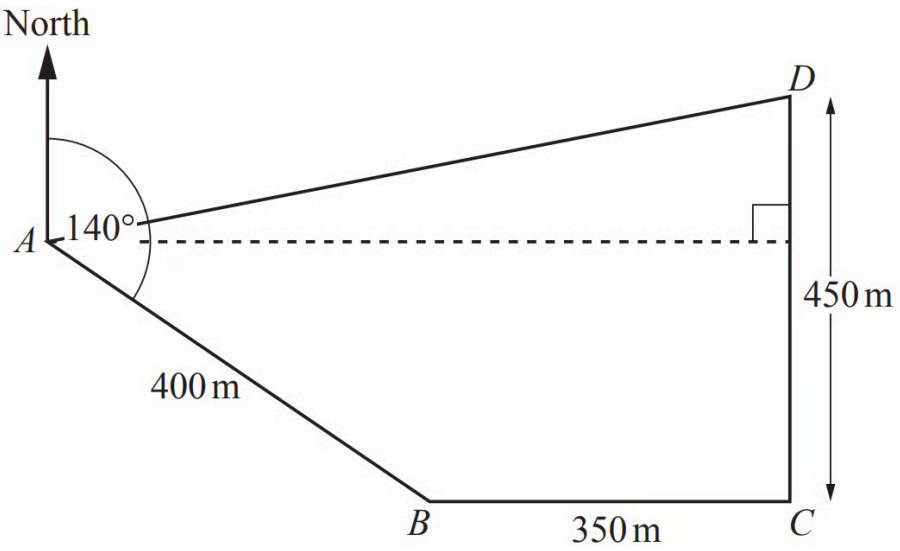
The diagram shows the positions of three points A, B and C in a field.

Calculate the shortest distance from point B to AC.

..... m

(3 marks)

6



The diagram shows a field *ABCD*.

The bearing of *B* from *A* is 140°.

C is due east of *B* and *D* is due north of *C*.

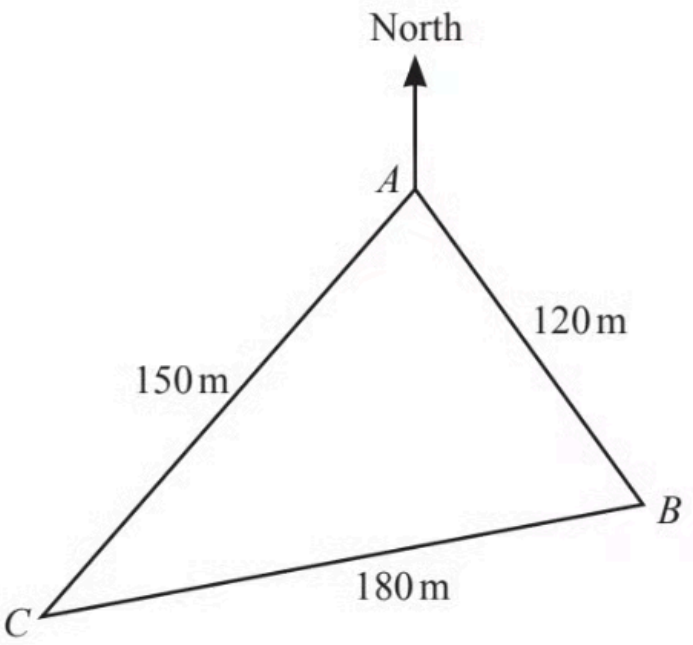
AB = 400m, *BC* = 350m and *CD* = 450m.

Calculate the distance from *D* to *A*.

..... m

(6 marks)

7



NOT TO SCALE

The angle BAC is $82.8°$ correct to 3 significant figures.

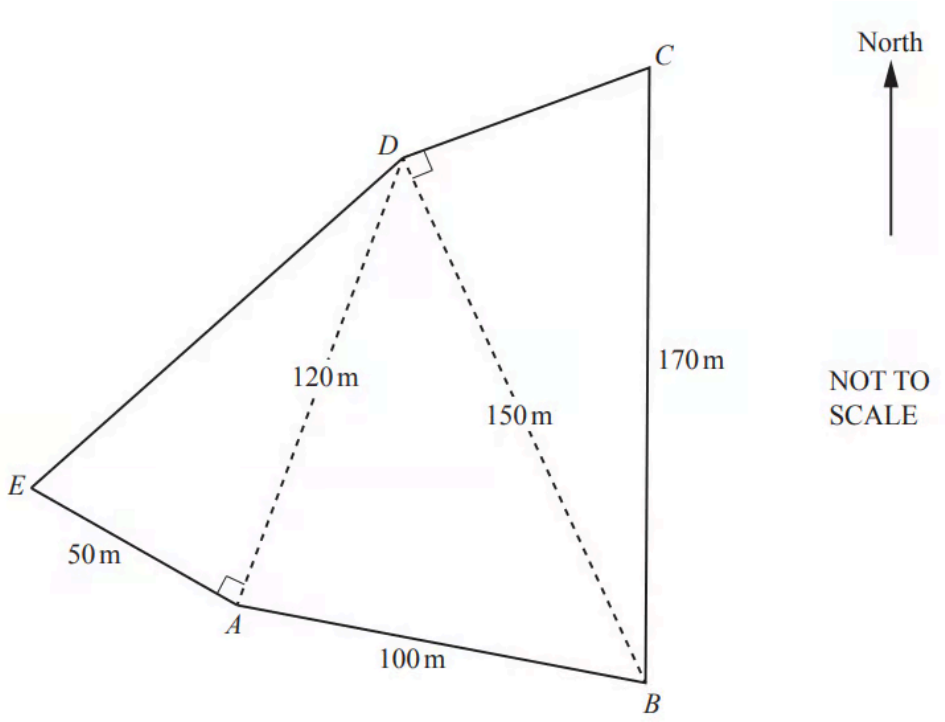
D is the point on *AC* that is nearest to *B*.

Calculate the distance from *D* to *A*.

..... m

(2 marks)

8



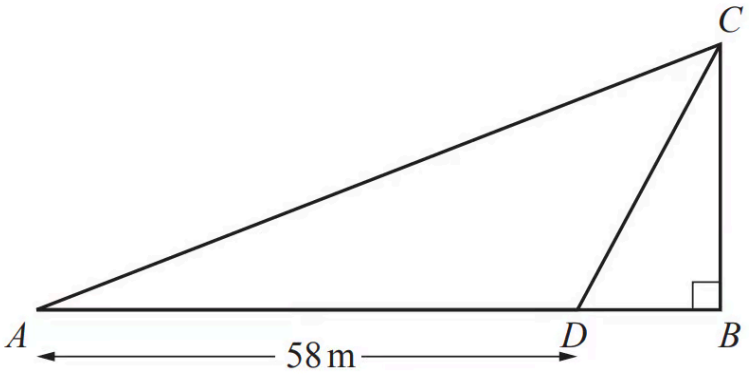
The diagram shows a field *ABCDE*.

Calculate the perimeter of the field *ABCDE*.

..... m

(4 marks)

9



NOT TO SCALE

In the diagram, BC is a vertical wall standing on horizontal ground AB. AC = 76.7 m.

D is the point on AB where AD = 58 m.

The angle of elevation of C from A is 26°.

The angle of elevation of C from D is 72°.

Calculate BD.

BD = ... m

(3 marks)