

Trigonometry

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 95 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 6): you must not use a calculator.
- **Section B** (questions 7 to 23): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 84.

Advice

- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher's use

Q	Mark	Q	Mark
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12			
TOTAL			

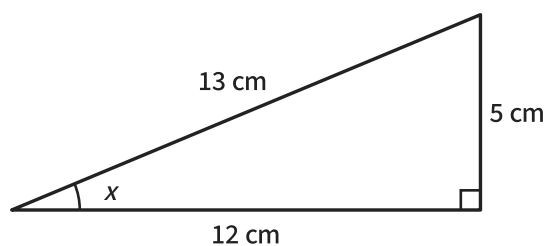
Section A



You must not use a calculator

Do not
write
outside
the box

- 1 Here is a right-angled triangle.



Not drawn accurately

Circle the correct statement.

$\sin x = \frac{12}{13}$

$\cos x = \frac{5}{13}$

$\tan x = \frac{5}{12}$

$\tan x = \frac{12}{5}$

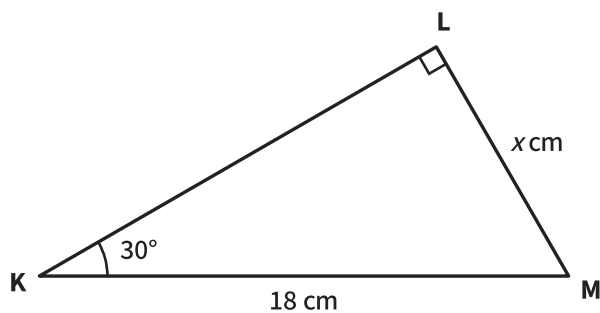
[1 mark]

- 2 (a) Write down the value of $\tan 45^\circ$

Answer _____

[1 mark]

- (b) KLM is a right-angled triangle.



Not drawn accurately

Work out the value of x .

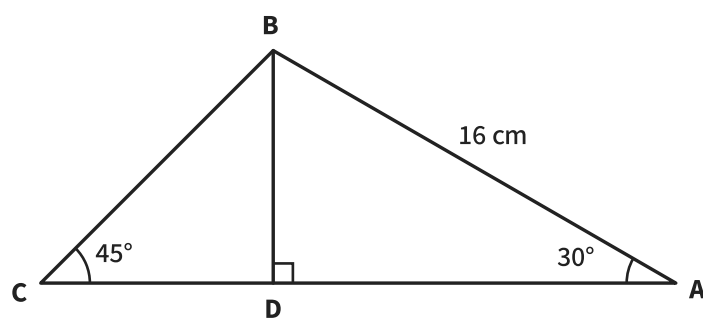
Answer _____ cm

[2 marks]

3

ABC is a triangle.

D is the point on AC so that BD is perpendicular to AC.



Not drawn accurately

Work out the length of AC.

Give your answer in the form $a + b\sqrt{3}$ where a and b are integers.

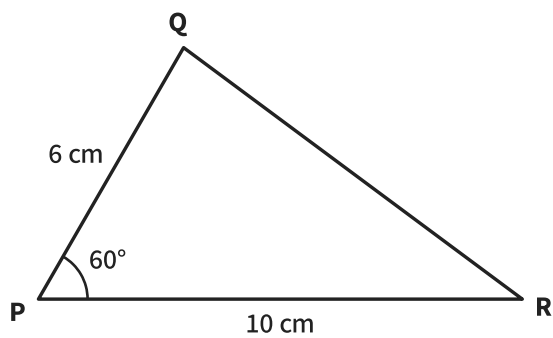
Answer _____ cm

[4 marks]

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4

4



Not drawn accurately

Show that $QR = 2\sqrt{19}$ cm

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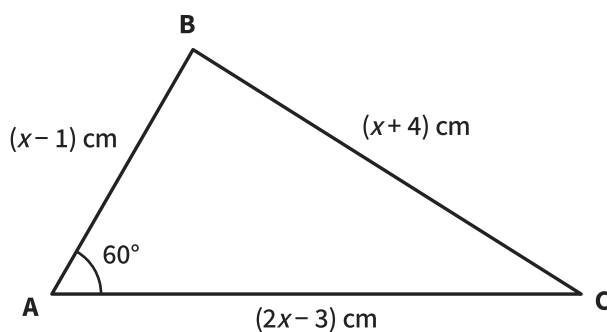
[3 marks]

5

ABC is a triangle.

$AB = (x - 1)$ cm, $AC = (2x - 3)$ cm and $BC = (x + 4)$ cm

Angle $BAC = 60^\circ$



Not drawn accurately

- (a) Show that $2x^2 - 17x - 9 = 0$

[3 marks]

- (b) Work out the area of triangle ABC.
Give your answer in the form $k\sqrt{3}$ where k is an integer.

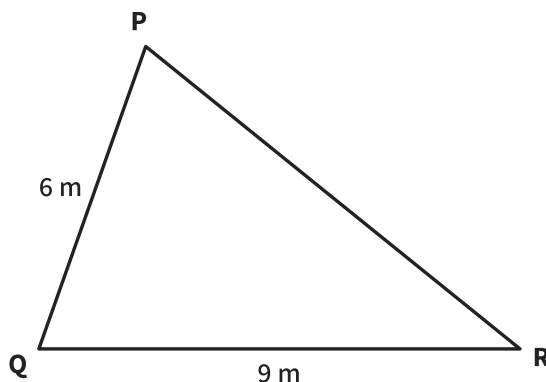
Answer _____ cm^2

[3 marks]

- 6** The diagram shows a triangular flower bed PQR.

$PQ = 6 \text{ m}$ and $QR = 9 \text{ m}$

$$\cos PQR = \frac{1}{3}$$



Not drawn accurately

- (a)** Work out the exact area of the flower bed.

Answer _____ m^2

[3 marks]

- (b)** A gardener lays a path from Q to the edge PR.
The path meets PR at X and is perpendicular to PR.
Work out the exact distance QX.

Answer _____ m

[3 marks]

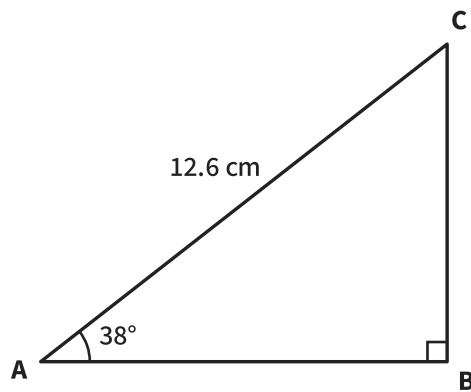
Section B



You may use a calculator

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- 7 ABC is a right-angled triangle.



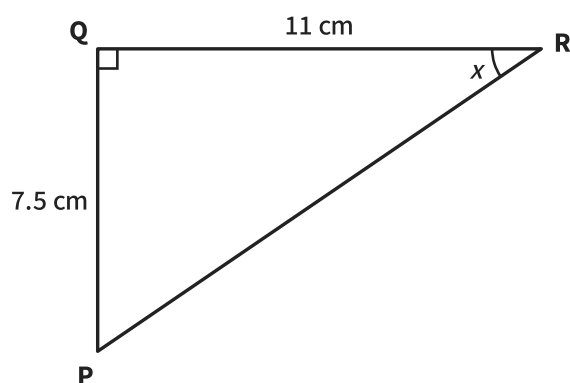
Not drawn accurately

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

Answer _____ cm

[2 marks]

- 8 PQR is a right-angled triangle.



Not drawn accurately

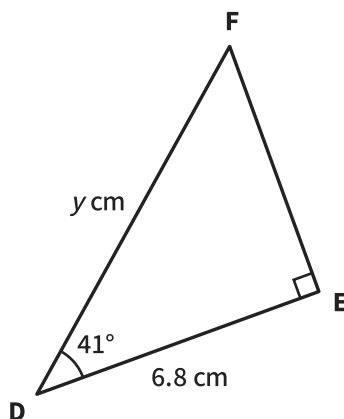
Work out the size of angle x .
Give your answer to 1 decimal place.

Answer _____ degrees
[3 marks]

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- 9 DEF is a right-angled triangle.

Do not
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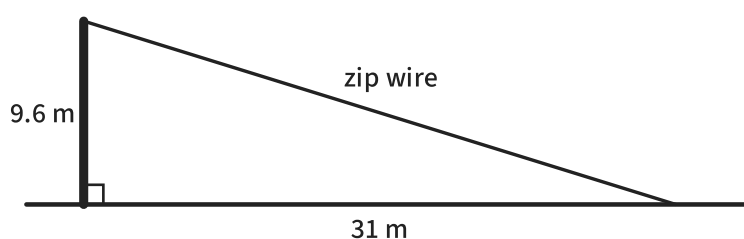
Not drawn accurately

Work out the value of y .
Give your answer to 1 decimal place.

Answer _____ cm

[3 marks]

- 10 The diagram shows a zip wire from the top of a vertical tower to level ground.
For safety, the angle between the zip wire and the ground must be no more than 15°



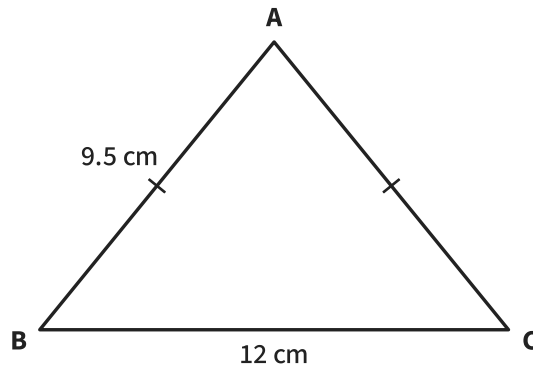
Not drawn accurately

Does this zip wire meet the safety rule?
You must show your working.

[3 marks]

- 11** ABC is an isosceles triangle with $AB = AC$.

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Not drawn accurately

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

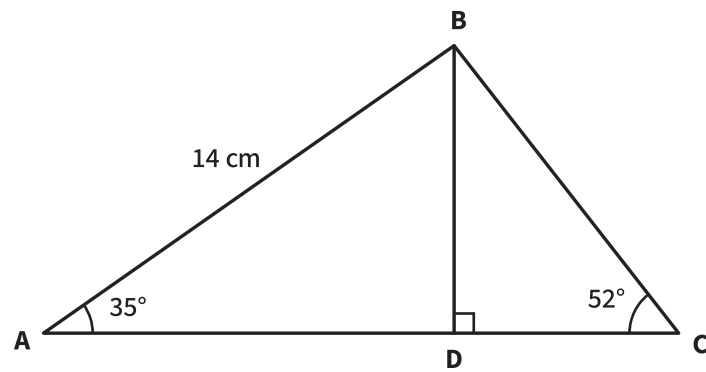
Answer _____ degrees
[3 marks]

12

ABC is a triangle.

D is the point on AC so that BD is perpendicular to AC.

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Not drawn accurately

Work out the length of CD.

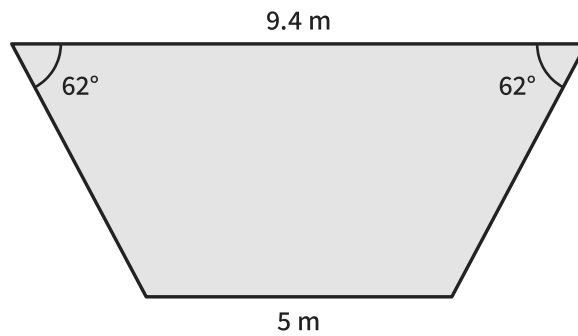
Give your answer to 1 decimal place.

Answer _____ cm

[4 marks]

13

The diagram shows the cross-section of a canal.
The cross-section is an isosceles trapezium.
The top of the canal is 9.4 m wide and the bottom is 5 m wide.
Each side of the canal makes an angle of 62° with the top.

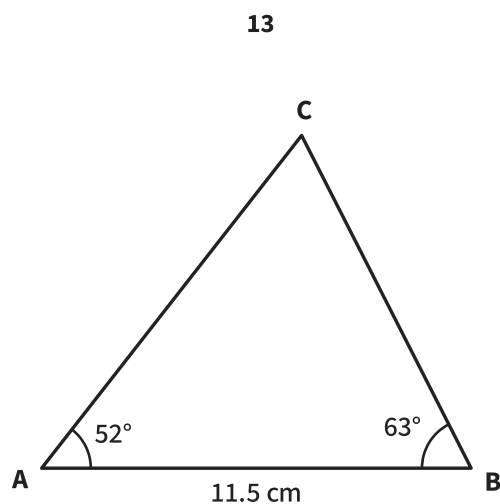


Not drawn accurately

Work out the area of the cross-section.
Give your answer to 1 decimal place.

Answer _____ m^2 **[4 marks]**Do not
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14



Do not
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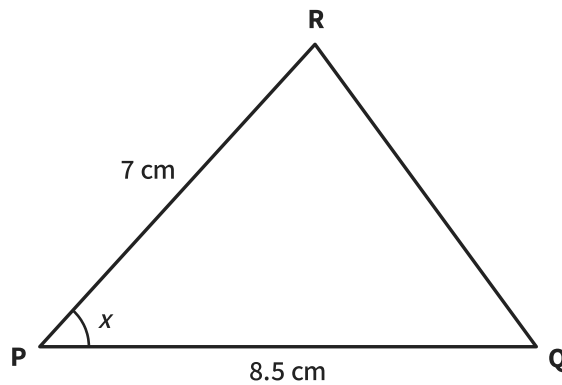
Not drawn accurately

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

Answer _____ cm

[3 marks]

- 15** The area of triangle PQR is 22 cm^2
Angle x is acute.

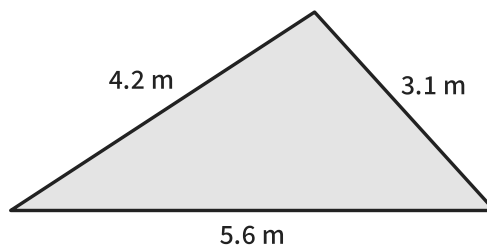


Not drawn accurately

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

Answer _____ degrees
[3 marks]

- 16** The diagram shows a triangular sail.



Not drawn accurately

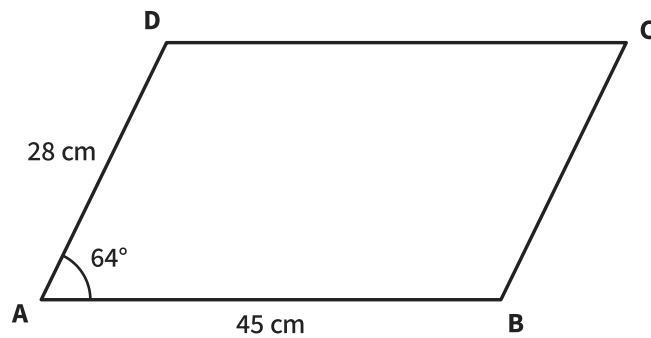
Work out the size of the largest angle in the sail.
Give your answer to 1 decimal place.

Answer _____ degrees
[3 marks]

17

A paving slab is in the shape of a parallelogram ABCD.
AB = 45 cm, AD = 28 cm and angle DAB = 64°

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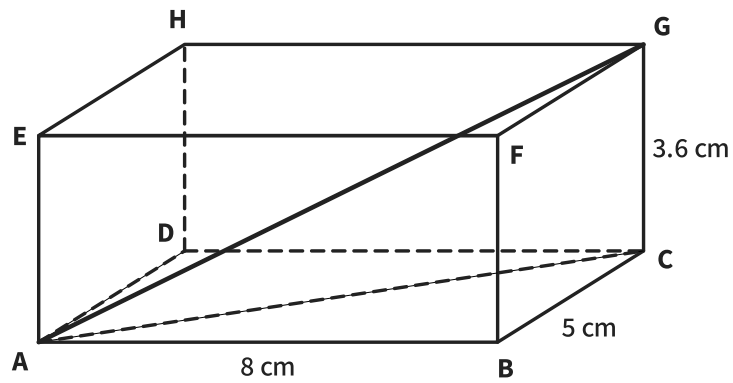
Not drawn accurately

Work out the length of the longer diagonal of the slab.
Give your answer to 1 decimal place.

Answer _____ cm

[3 marks]

- 18 ABCDEFGH is a cuboid.



Not drawn accurately

Work out the size of the angle between the diagonal AG and the base ABCD.
Give your answer to 1 decimal place.

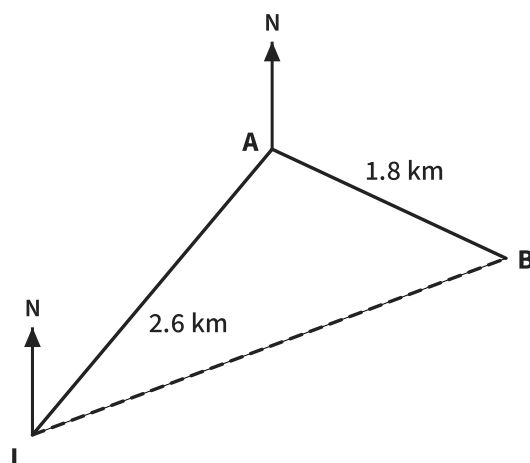
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Answer _____ degrees
[4 marks]

19

A drone flies 2.6 km from its launch point L on a bearing of 040° to a point A. It then flies 1.8 km on a bearing of 115° to a point B.

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Not drawn accurately

Work out the distance from L to B.
Give your answer to 1 decimal place.

Answer _____ km

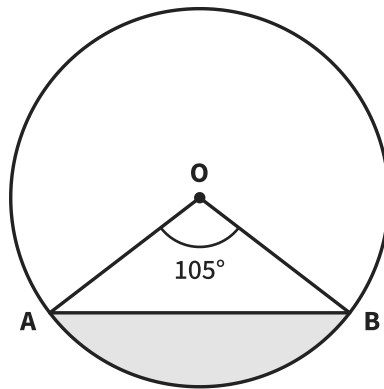
[4 marks]

20

The diagram shows a circle, centre O.

A and B are points on the circle and angle $AOB = 105^\circ$

The area of the shaded segment is 25 cm^2



Not drawn accurately

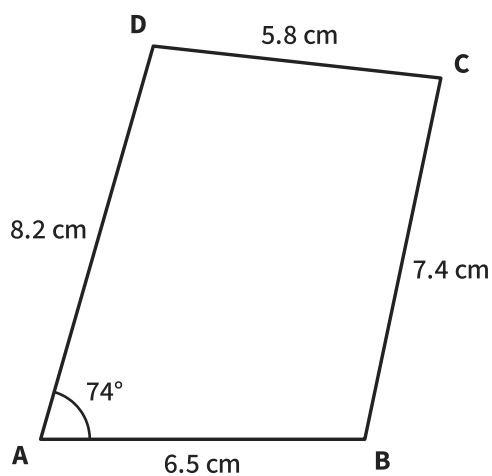
Work out the radius of the circle.

Give your answer to 1 decimal place.

Answer _____ cm

[4 marks]

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Not drawn accurately

Work out the area of quadrilateral ABCD.
Give your answer to 1 decimal place.

Answer _____ cm^2 **[5 marks]**

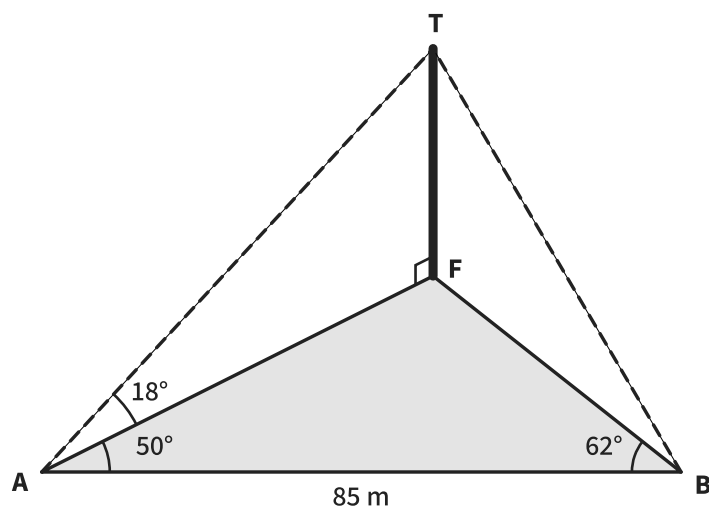
22

A, B and F are three points on level ground.

A floodlight tower, FT, stands vertically at F, with T at the top.

$AB = 85$ m, angle $FAB = 50^\circ$ and angle $ABF = 62^\circ$

The angle of elevation of T from A is 18°



Work out the angle of elevation of T from B.

Give your answer to 1 decimal place.

Answer _____ degrees

[5 marks]

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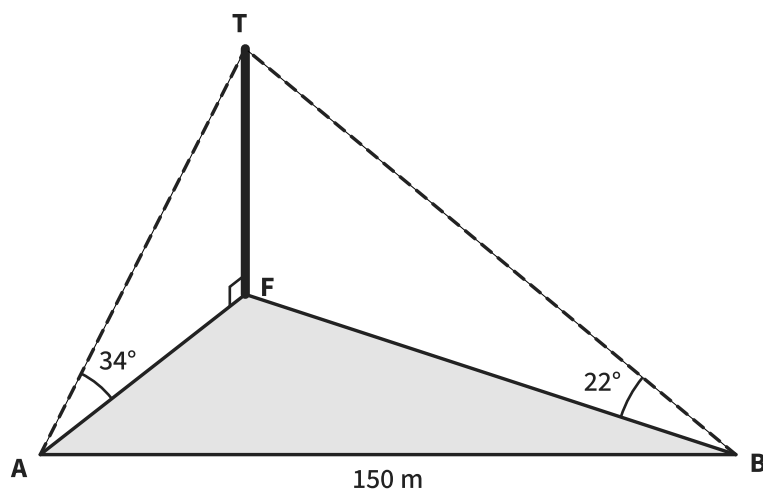
23

A radio mast, FT , stands vertically on level ground, with its foot at F and its top at T .

A surveyor stands at A , due south of F , then walks 150 m due east to B .

The angle of elevation of T from A is 34°

The angle of elevation of T from B is 22°



Not drawn accurately

Work out the height of the mast.

Give your answer to 3 significant figures.

Answer _____ m

[5 marks]

END OF QUESTIONS