

Pythagoras

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 75 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 9): you must not use a calculator.
- **Section B** (questions 10 to 19): 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 65.

Advice

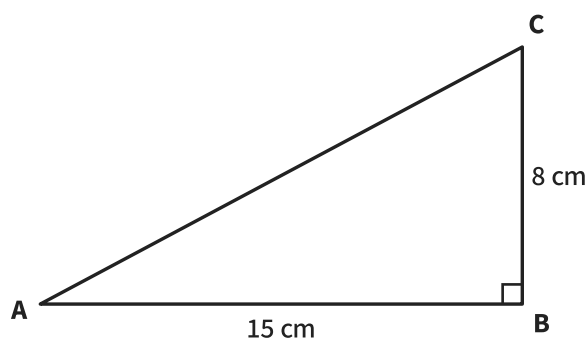
- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher's use

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

Section A**You must not use a calculator**Do not
write
outside
the box

- 1** ABC is a right-angled triangle.



Not drawn accurately

Work out the length of AC.

Answer _____ cm

[2 marks]

- 2** A triangle has sides of length 9 cm, 12 cm and 16 cm

Is the triangle right-angled?

You must show your working.

[2 marks]

3 A is the point $(-3, 2)$

B is the point $(5, 8)$

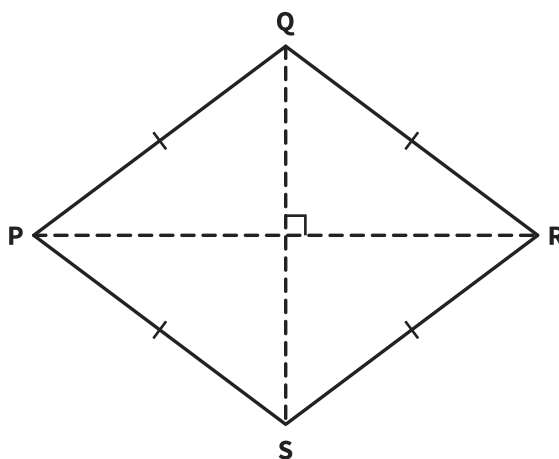
Work out the length of AB.

Answer _____ units

[3 marks]

4 PQRS is a rhombus.

The diagonals of the rhombus are 18 cm and 24 cm long.



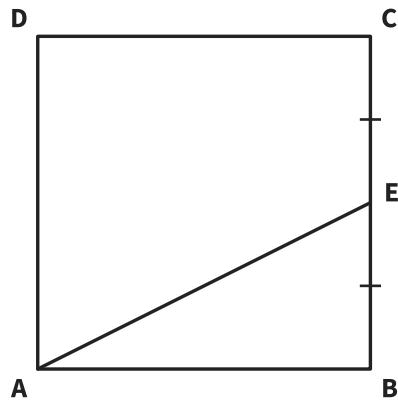
Not drawn accurately

Work out the perimeter of the rhombus.

Answer _____ cm

[3 marks]

- 5** ABCD is a square with sides of length 6 cm
E is the midpoint of BC.



Not drawn accurately

Work out the length of AE.

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

Answer _____ cm

[3 marks]

- 6** The point P has coordinates $(2, k)$
The point Q has coordinates $(-18, 1)$
The distance PQ is 29 units

Work out the two possible values of k .

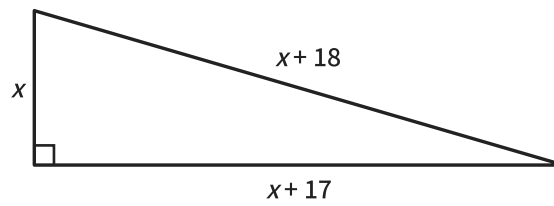
$k =$ _____

[3 marks]

Do not
write
outside
the box

7

Here is a right-angled triangle.
All lengths are in centimetres.



Not drawn accurately

- (a) Show that $x^2 - 2x - 35 = 0$

[3 marks]

- (b) Work out the perimeter of the triangle.

Answer _____ cm

[2 marks]

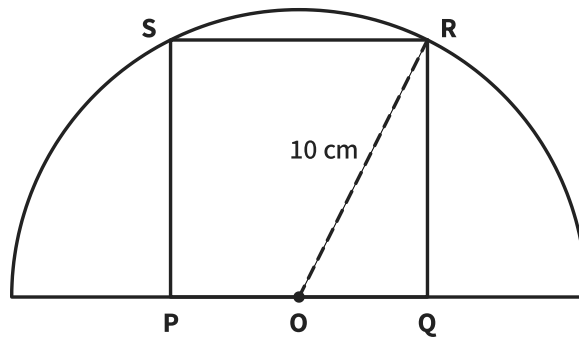
Do not
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the box

8

The diagram shows a semicircle with centre O and radius 10 cm.

PQRS is a square.

P and Q are on the diameter of the semicircle. R and S are on the arc.



Not drawn accurately

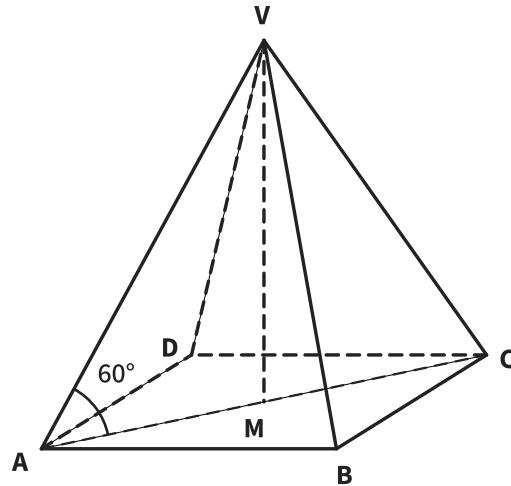
Show that the area of the square is 80 cm^2

Do not
write
outside
the box

[4 marks]

- 9 A solid glass paperweight is a pyramid with a square base ABCD. The vertex V is directly above M, the centre of the base. The angle between the sloping edge VA and the base is 60° . The volume of the paperweight is $36\sqrt{6} \text{ cm}^3$

Volume of a pyramid = $\frac{1}{3} \times \text{area of base} \times \text{perpendicular height}$



Not drawn accurately

Work out the length of VA as a surd.
You must show your working.

Answer _____ cm

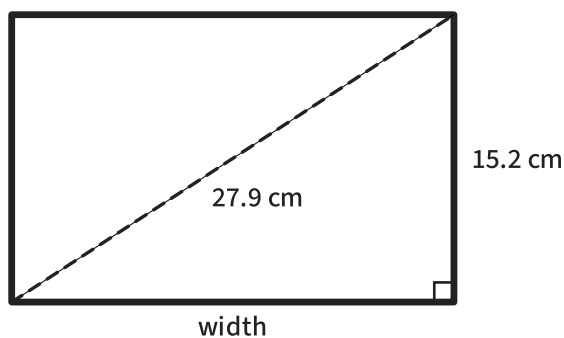
[5 marks]

Section B

You may use a calculator

Do not
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outside
the box

- 10** The screen of a tablet is a rectangle.
The diagonal of the screen is 27.9 cm
The height of the screen is 15.2 cm



Not drawn accurately

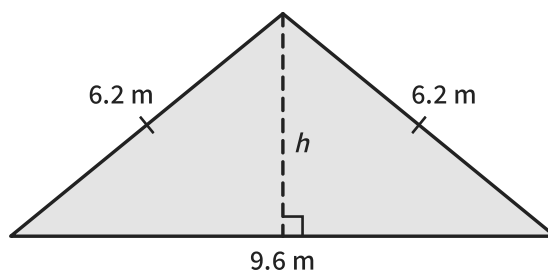
Work out the width of the screen.
Give your answer to 1 decimal place.

Answer _____ cm

[3 marks]

11

The diagram shows the cross-section of a roof.
The cross-section is an isosceles triangle.
The base is 9.6 m wide and each sloping side is 6.2 m long.



Not drawn accurately

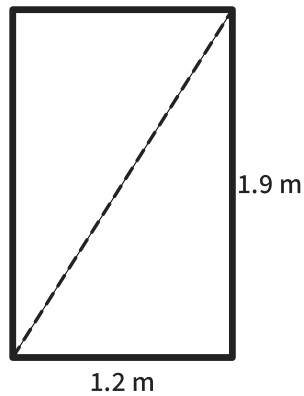
Work out the height, h , of the roof.
Give your answer to 1 decimal place.

Answer _____ m

[3 marks]Do not
write
outside
the box

12

A doorway is a rectangle 1.9 m high and 1.2 m wide.
Jun wants to carry a thin, round table top through the doorway.
The table top has a diameter of 2.2 m



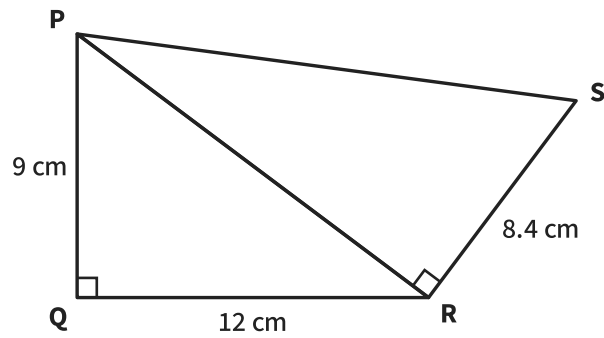
Not drawn accurately

Can the table top fit through the doorway?
You must show your working.

Do not
write
outside
the box

[3 marks]

- 13** The diagram shows two right-angled triangles, PQR and PRS.



Not drawn accurately

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

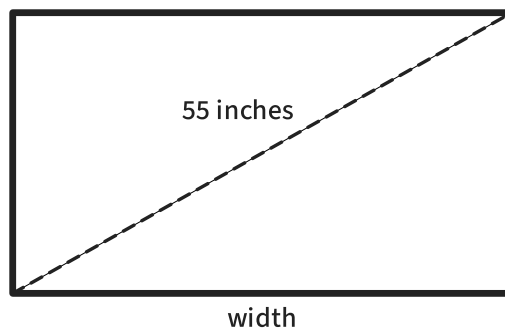
Answer _____ cm

[3 marks]

Do not
write
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14

The size of a television screen is the length of its diagonal.
A television screen is a rectangle with width : height = 16 : 9
The size of the screen is 55 inches.
1 inch = 2.54 cm



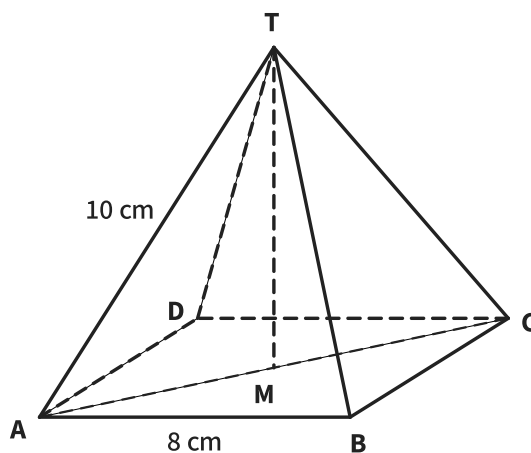
Not drawn accurately

Work out the width of the screen in centimetres.
Give your answer to 1 decimal place.

Answer _____ cm

[4 marks]Do not
write
outside
the box

- 15** The diagram shows a pyramid with a square base ABCD.
The vertex T is directly above M, the centre of the base.
 $AB = 8\text{ cm}$ and $TA = TB = TC = TD = 10\text{ cm}$



Not drawn accurately

Work out the height TM of the pyramid.
Give your answer to 1 decimal place.

Answer _____ cm

[4 marks]

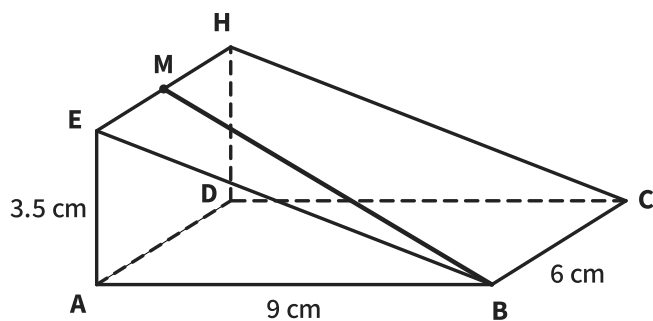
Do not
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16

The diagram shows a wedge.

The base ABCD is a horizontal rectangle and the face ADHE is a vertical rectangle.

M is the midpoint of EH.



Not drawn accurately

Work out the length of BM.

Give your answer to 1 decimal place.

Answer _____ cm

[4 marks]

Do not
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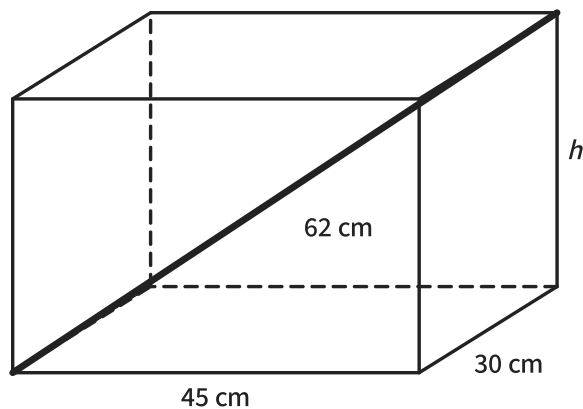
17

A storage box is a cuboid.

The base of the box is 45 cm by 30 cm.

The longest straight rod that fits inside the closed box is 62 cm long.

The rod goes from one corner of the box to the opposite corner.



Not drawn accurately

Work out the height of the box.

Give your answer to 1 decimal place.

Answer _____ cm

[3 marks]

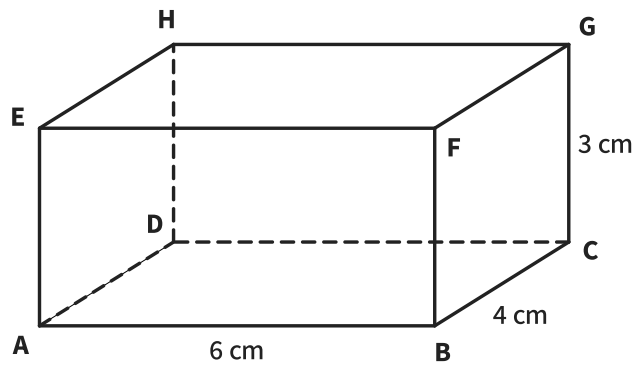
Do not
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18

ABCDEFGH is a closed box in the shape of a cuboid.

An ant walks on the outside of the box from A to G.

It walks across the face ABFE and then across the top EFGH, crossing the edge EF.



Not drawn accurately

Work out the shortest distance the ant can walk.

Give your answer to 1 decimal place.

Answer _____ cm

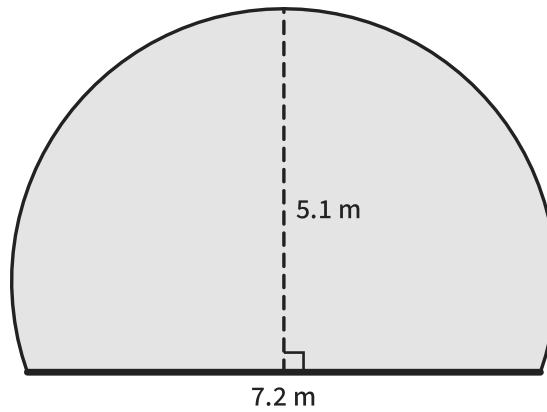
[3 marks]

Do not
write
outside
the box

19

The diagram shows the cross-section of a road tunnel.
The roof of the tunnel is an arc of a circle. The road is horizontal.
The road is 7.2 m wide and the greatest height of the tunnel is 5.1 m.

A lorry drives through the tunnel along the middle of the road.
The cross-section of the lorry is a rectangle 3.4 m wide and 4.75 m tall.



Not drawn accurately

Can the lorry go through the tunnel?
You must show your working.

[5 marks]**END OF QUESTIONS**