Name	Class

MATHS TEACHER HUB

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Pythagoras theorem

(9 – 1) Topic booklet

Higher

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

Instructions

•Use **black** ink or ball-point pen.
•**Fill in the boxes** at the top of this page with your name, centre number and candidate number.
•Answer **all** questions.
•Answer the questions in the spaces provided
– *there may be more space than you need*.
•Diagrams are NOT accurately drawn, unless otherwise indicated.
•You must **show all your working out.**
•If the question is a **1H** question you are not allowed to use a calculator.
•If the question is a **2H** or a **3H** question, you may use a calculator to help you answer.

Information

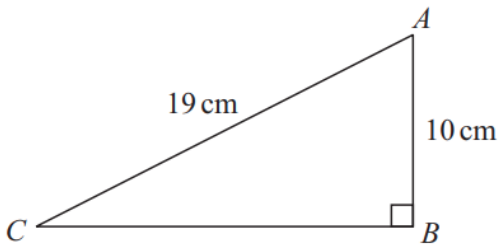
•The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question*.

Advice

•Read each question carefully before you start to answer it.
•Keep an eye on the time.
•Try to answer every question.
•Check your answers if you have time at the end.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

1 *ABC* is a right-angled triangle.

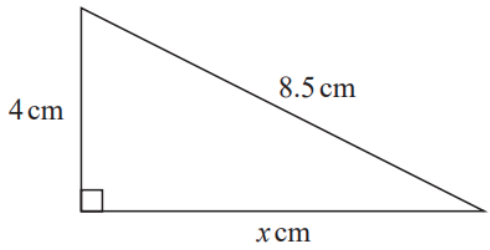


Work out the length of *CB*.
Give your answer correct to 3 significant figures.

..... cm

June 2024 – Paper 2H **(Total for Question 1 is 2 marks)**

1 Here is a right-angled triangle.



Work out the value of x.

$x =$ .....

(Total for Question 1 is 2 marks)

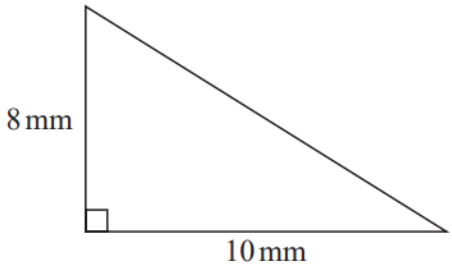
4 Triangle ABC has perimeter 20 cm.

$AB = 7$ cm.
$BC = 4$ cm.

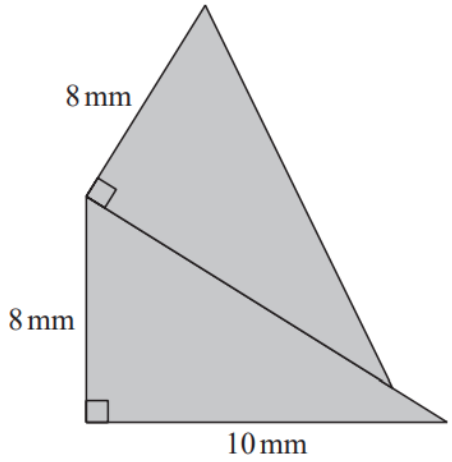
By calculation, deduce whether triangle ABC is a right-angled triangle.

(Total for Question 4 is 4 marks)

5 Here is a right-angled triangle.



The shaded shape below is made from two of these triangles.

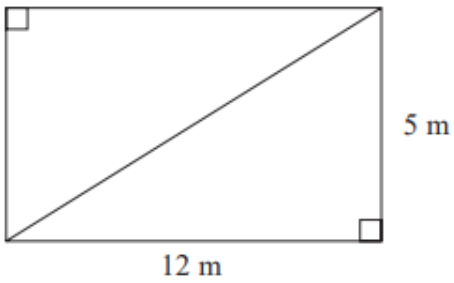


Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

..... mm

(Total for Question 5 is 4 marks)

5 This rectangular frame is made from 5 straight pieces of metal.



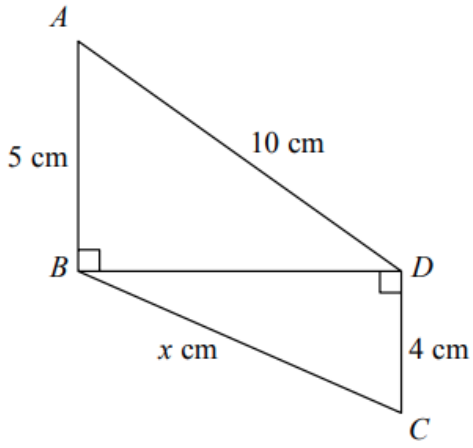
The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.

..... kg

(Total for Question 5 is 5 marks)

6 Triangles *ABD* and *BCD* are right-angled triangles.

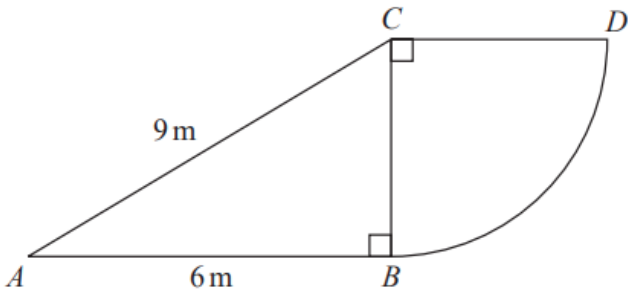


Work out the value of x.
Give your answer correct to 2 decimal places.

.....

(Total for Question 6 is 4 marks)

7 The diagram shows a right-angled triangle and a quarter circle.



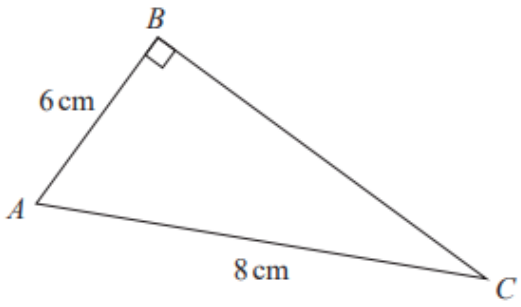
The right-angled triangle ABC has angle $ABC = 90°$
The quarter circle has centre C and radius CB.

Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.
You must show all your working.

..... m^2

(Total for Question 7 is 4 marks)

8 ABC is a right-angled triangle.



Here is Sarah's method to find the length of BC.

$$BC^2 = AB^2 + AC^2$$
$$= 6^2 + 8^2$$
$$= 100$$
$$BC = 10$$

What mistake has Sarah made in her method?

.....

.....

.....

(1)

June 2019 – Paper 3H **(Total for Question 8 is 1 mark)**

9

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

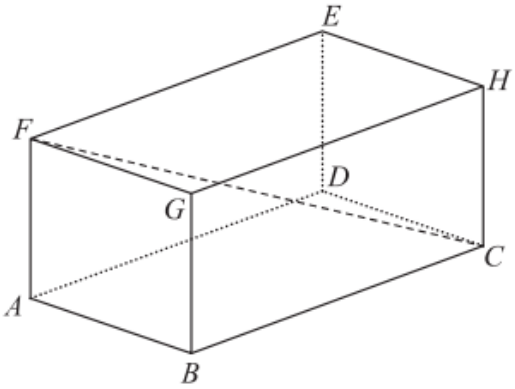
The area of the circle is 49 cm^2.

Work out the value of x.
Give your answer correct to 3 significant figures.

.....

(Total for Question 8 is 4 marks)

12 The diagram shows a cuboid *ABCDEFGH*.



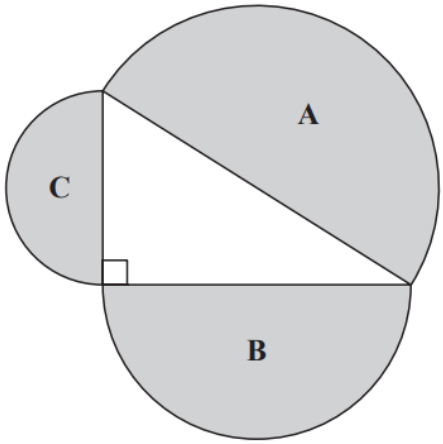
AB = 7 cm, *AF* = 5 cm and *FC* = 15 cm.

Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 12 is 4 marks)

13 A right-angled triangle is formed by the diameters of three semicircular regions, **A**, **B** and **C** as shown in the diagram.



Show that

area of region **A** = area of region **B** + area of region **C**

(Total for Question 13 is 3 marks)

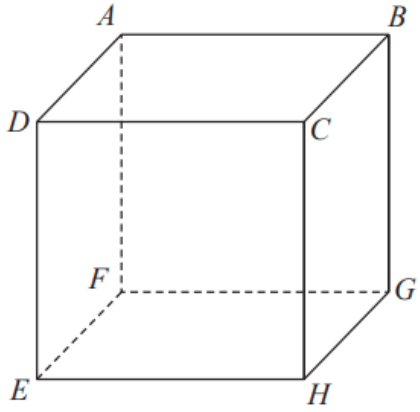
13 A and B are points on a centimetre grid.
A is the point with coordinates $(-7, 6)$
B is the point with coordinates $(8, -5)$

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

..... cm

November 2022 – Paper 2H **(Total for Question 13 is 2 marks)**

18 The diagram shows a cube.



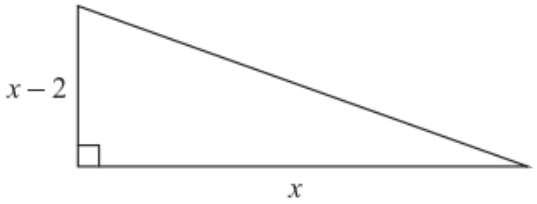
$AH = 11.3$ cm correct to the nearest mm.

Calculate the lower bound for the length of an edge of the cube.
You must show all your working.

..... cm

(Total for Question 18 is 4 marks)

19 Here is a right-angled triangle.



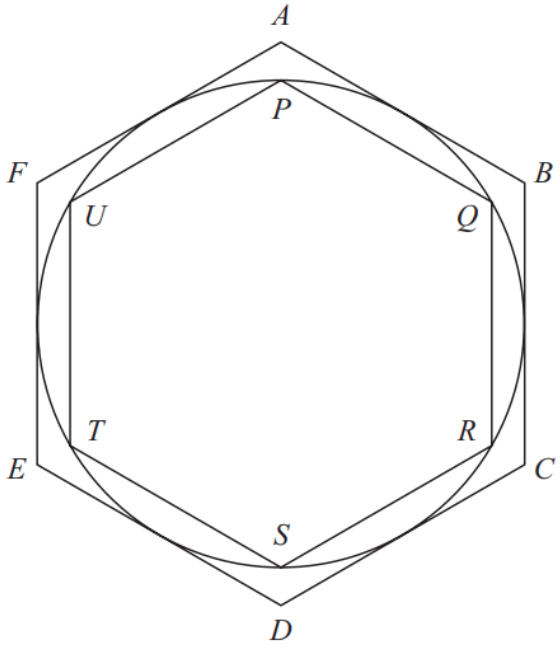
All measurements are in centimetres.
The area of the triangle is 2.5 cm^2.

Find the perimeter of the triangle.
Give your answer correct to 3 significant figures.
You must show all of your working.

..... cm

(Total for Question 19 is 6 marks)

21 The diagram shows a circle, radius r cm and two regular hexagons.



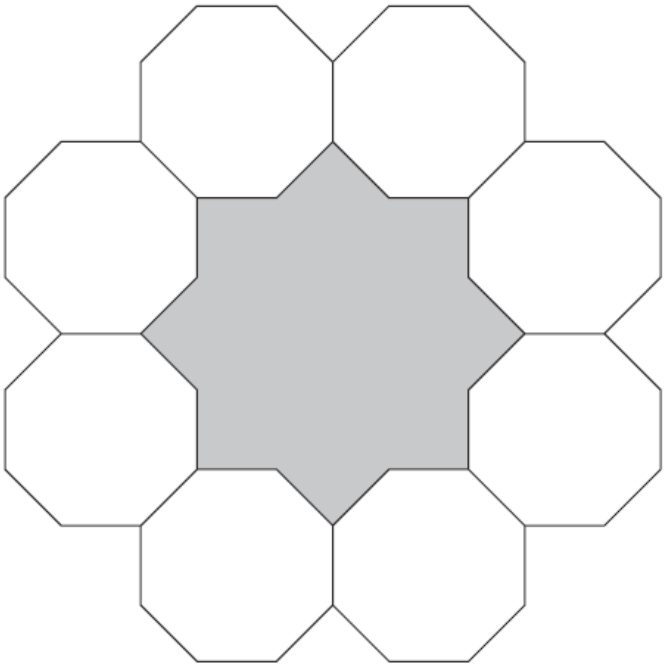
Each side of the larger hexagon $ABCDEF$ is a tangent to the circle.
Each side of the smaller hexagon $PQRSTU$ is a chord of the circle.

By considering perimeters, show that

$$3 < \pi < 2\sqrt{3}$$

(Total for Question 21 is 4 marks)

24 The diagram shows 8 identical regular octagons joined to enclose a shaded shape.



Each octagon has sides of length a.

Find, in terms of a, an expression for the area of the shaded shape.
Give your answer in the form $p(2+\sqrt{2})a^2$ where p is an integer.
You must show all your working.

(Total for Question 24 is 5 marks)