Name ANSWERS	Class

MATHS TEACHER HUB

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Pythagoras theorem

(9 – 1) Topic booklet

Foundation

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 **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

Information

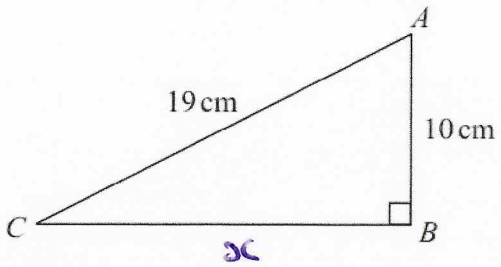
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

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.

20 ABC is a right-angled triangle.



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

$x^2 = 19^2 - 10^2$

$x^2 = 361 - 100$

$x^2 = 261$

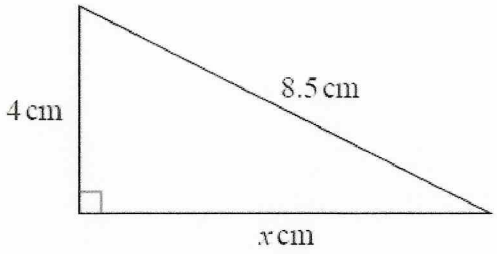
$x = \sqrt{261}$

$x = 16.15549$

16.2 ..... cm

(Total for Question 20 is 2 marks)

22 Here is a right-angled triangle.



Work out the value of x.

$x^2 = 8.5^2 - 4^2$

$x^2 = 72.25 - 16$

$x^2 = 56.25$

$x = \sqrt{56.25}$

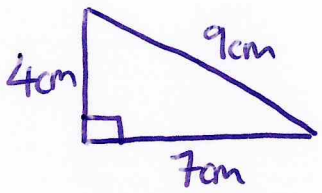
$x = 7.5$

$x =$ 7.5

(Total for Question 22 is 2 marks)

22 Triangle ABC has perimeter 20 cm.

$AB = 7$ cm.
$BC = 4$ cm.
AC = 9cm
By calculation, deduce whether triangle ABC is a right-angled triangle.

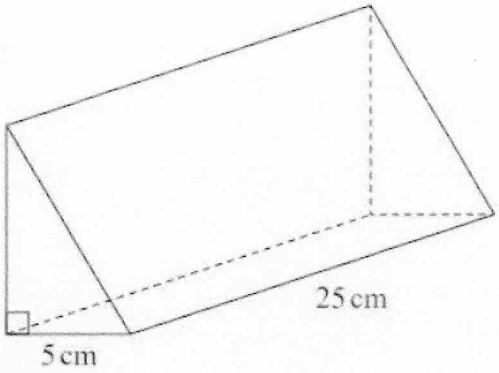


$4^2 + 7^2 \neq 9^2$
$16 + 49 \neq 81$
$65 \neq 81$

ABC is not a right angle triangle.

(Total for Question 22 is 4 marks)

25 The diagram shows a prism.

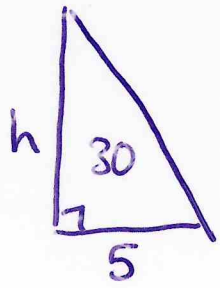


The cross section of the prism is a right-angled triangle.
The base of the triangle has length 5 cm

The prism has length 25 cm
The prism has volume 750 cm^3

Work out the height of the prism.

$\frac{750}{25} = 30cm^2$ is the area of the front triangle



$\frac{5 \times h}{2} = 30$

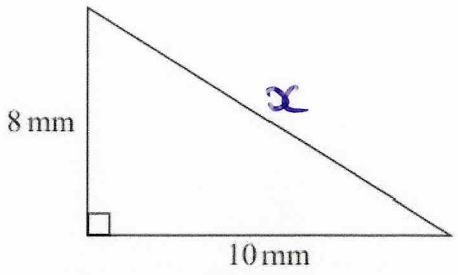
$5 \times h = 60$

$h = 12cm$

12 cm

(Total for Question 25 is 3 marks)

25 Here is a right-angled triangle.



$x^2 = 10^2 + 8^2$

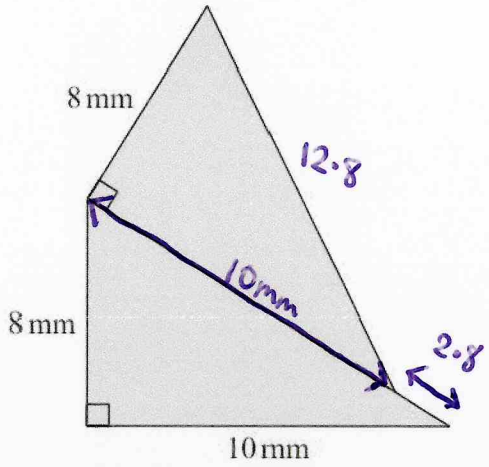
$x^2 = 100 + 64$

$x^2 = 164$

$x = \sqrt{164}$

$x = 12.806$

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

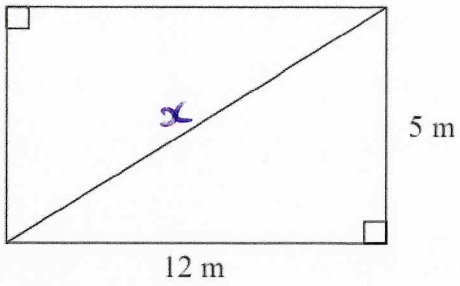


Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

41.6 mm

(Total for Question 25 is 4 marks)

25 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.

$x^2 = 12^2 + 5^2$

$x^2 = 144 + 25$

$x^2 = 169$

$x = \sqrt{169}$

$x = 13$

Frame $= 5 + 5 + 12 + 12 + 13$

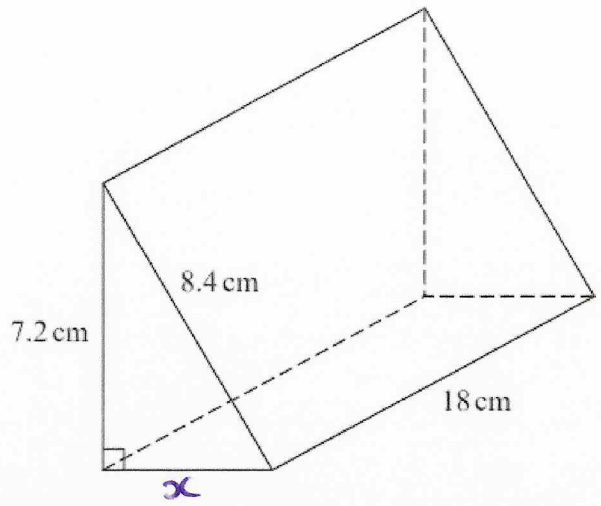
$= 45\text{m}$

$45 \times 1.5 = 67.5$

67.5 kg

(Total for Question 25 is 5 marks)

26 Here is a triangular prism.



Work out the volume of the prism.
Give your answer correct to 3 significant figures.

$x^2 = 8.4^2 - 7.2^2$

$x^2 = 70.56 - 51.84$

$x^2 = 18.72$

$x = \sqrt{18.72}$

$x = 4.32666\text{cm}$

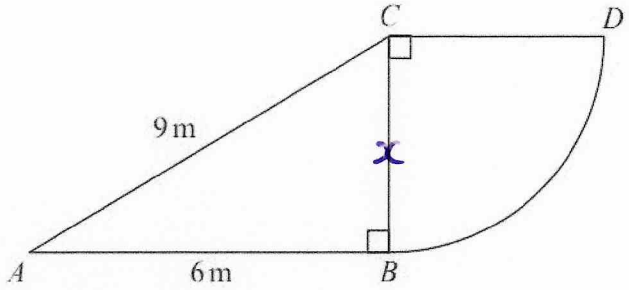
$\text{Volume} = \left(\frac{4.32666 \times 7.2}{2}\right) \times 18$

$= 280.3676672$

280 ..... cm^3

(Total for Question 26 is 5 marks)

27 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.

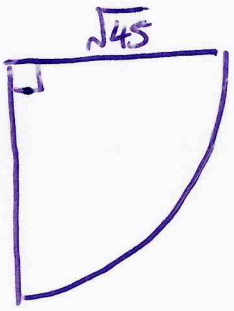
$x^2 = 9^2 - 6^2$

$x^2 = 81 - 36$

$x^2 = 45$

$x = \sqrt{45}$

x = radius



$\text{Area} = \frac{1}{4}(\pi \times r^2)$

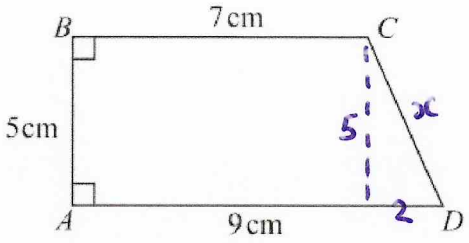
$= \frac{1}{4}(\pi \times \sqrt{45}^2)$

$= 35.3429$

35.3 ..... m^2

(Total for Question 27 is 4 marks)

28 *ABCD* is a trapezium.



A square has the same perimeter as this trapezium.

Work out the area of the square.
Give your answer correct to 3 significant figures.

$x^2 = 5^2 + 2^2$

$x^2 = 25 + 4$

$x^2 = 29$

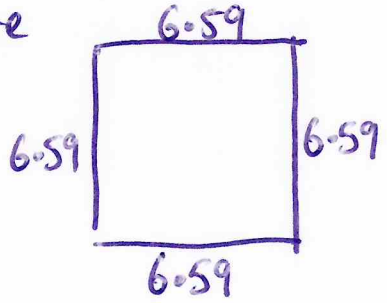
$x = \sqrt{29}$

$x = 5.385\text{cm}$

Perimeter $= 5 + 7 + 9 + 5.385$

$= 26.38$

Square



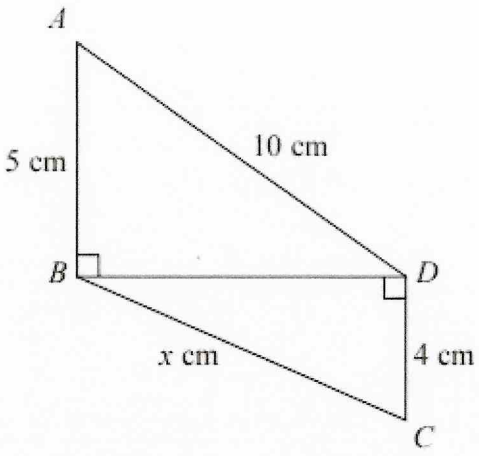
6.59×6.59

$= 43.511$

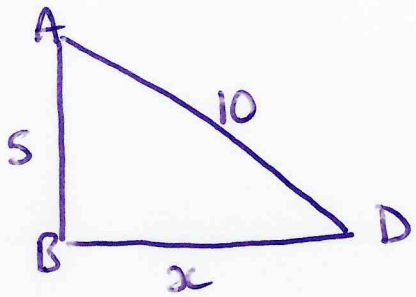
43.5 cm²

(Total for Question 28 is 5 marks)

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



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



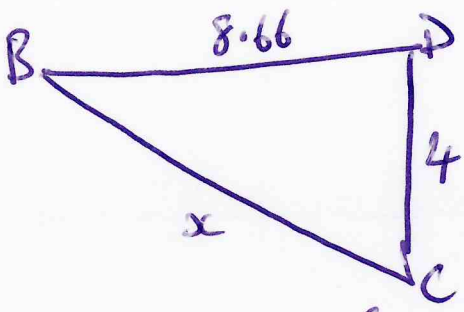
$x^2 = 10^2 - 5^2$

$x^2 = 100 - 25$

$x^2 = 75$

$x = \sqrt{75}$

$x = 8.66025$



$x^2 = 8.66^2 + 4^2$

$x^2 = 74.99 + 16$

$x^2 = 90.9956$

$x = \sqrt{90.99}$

$x = 9.54\text{cm}$

(Total for Question 28 is 4 marks)