

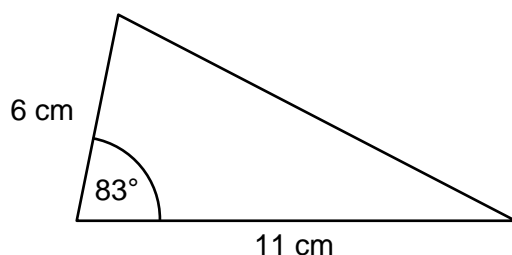


Area of a Triangle (Trigonometry)



REVISE THIS
TOPIC

1 Work out the area of the triangle.



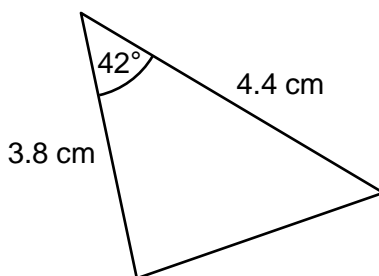
Not drawn
accurately

[2 marks]

$$\frac{1}{2} \times 6 \times 11 \times \sin(83)$$

Answer 32.8 cm²

2 Work out the area of the triangle.



Not drawn
accurately

[2 marks]

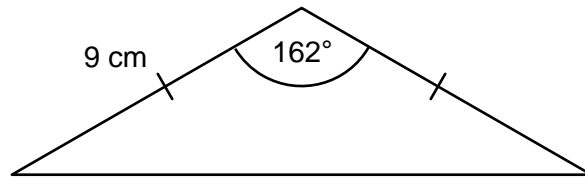
$$\frac{1}{2} \times 3.8 \times 4.4 \times \sin(42)$$

Answer 5.6 cm²



3

Work out the area of the triangle.



Not drawn accurately

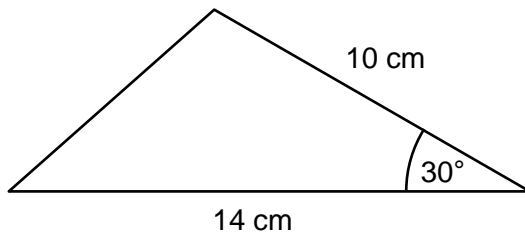
[2 marks]

$$\frac{1}{2} \times 9 \times 9 \times \sin(162)$$

Answer 12.5 cm²

4

Work out the area of the triangle.



Not drawn accurately



[3 marks]

$$\frac{1}{2} \times 10 \times 14 \times \sin(30)$$

$$= \frac{1}{2} \times 10 \times 14 \times \frac{1}{2}$$

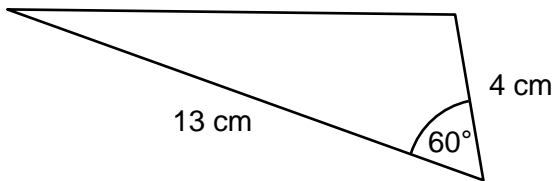
$$= 5 \times 7$$

Answer 35 cm²




5

Work out the area of the triangle.

Give your answer in the form $k\sqrt{3}$, where k is an integer.

Not drawn accurately

[3 marks]

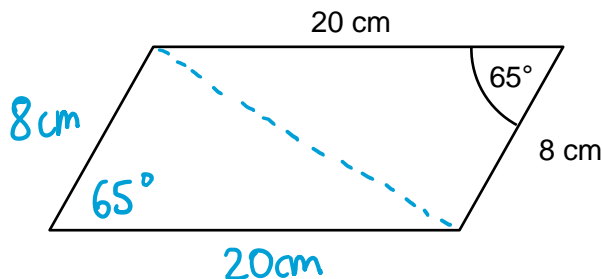
$$\frac{1}{2} \times 4 \times 13 \times \sin(60)$$
$$= \frac{1}{2} \times 4 \times 13 \times \frac{\sqrt{3}}{2}$$

$$= \frac{52\sqrt{3}}{4}$$

Answer $13\sqrt{3}$ cm²

6

Work out the area of the parallelogram.



Not drawn accurately

[3 marks]

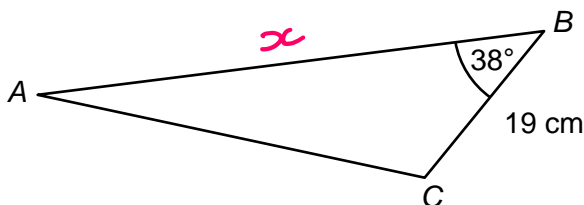
$$\frac{1}{2} \times 20 \times 8 \times \sin(65) = 72.50462296$$

$$72.50462296 \times 2 = 145.0092459$$

Answer 145.0 cm²

Turn over ►

7

The area of triangle ABC is 350 cm^2


Not drawn accurately

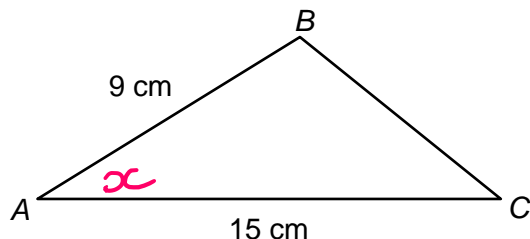
Work out the length of AB .

[3 marks]

$$\begin{aligned} \times 2 \quad \left(\frac{1}{2} \times 19 \times x \times \sin(38) = 350 \right) \times 2 \\ 19 \sin(38) x = 700 \\ x = \frac{700}{19 \sin(38)} \end{aligned}$$

Answer 59.8 cm

8

The area of triangle ABC is 23 cm^2


Not drawn accurately

Work out the size of the acute angle, BAC .

[3 marks]

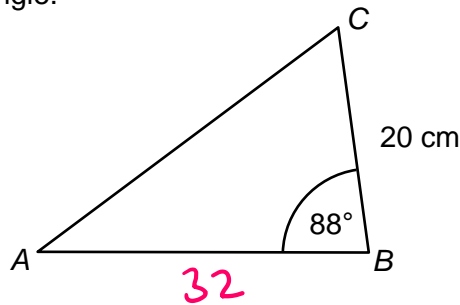
$$\begin{aligned} \times 2 \quad \left(\frac{1}{2} \times 9 \times 15 \times \sin(x) = 23 \right) \times 2 \\ 135 \sin(x) = 46 \\ \sin(x) = \frac{46}{135} \\ x = \sin^{-1}\left(\frac{46}{135}\right) \end{aligned}$$

Answer 19.9 °




9

ABC is a triangle.



Not drawn accurately

$$AB : BC = 8 : 5$$

Work out the area of triangle ABC.

[3 marks]

$$20 \div 5 = 4$$

$$8 \times 4 = 32$$

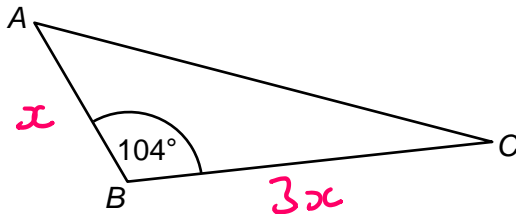
$$\frac{1}{2} \times 20 \times 32 \times \sin(88)$$

$$319.8$$

Answer _____ cm²

10

ABC is a triangle.



Not drawn accurately

$$AB : BC = 1 : 3$$

The area of triangle ABC is 123 cm^2

Work out the length of AB.

[3 marks]

$$\frac{1}{2} \times x \times 3x \times \sin(104) = 123$$

$$3x^2 \sin(104) = 246$$

$$x^2 = \frac{246}{3 \sin(104)}$$

$$x = \sqrt{\frac{246}{3 \sin(104)}}$$

$$9.2$$

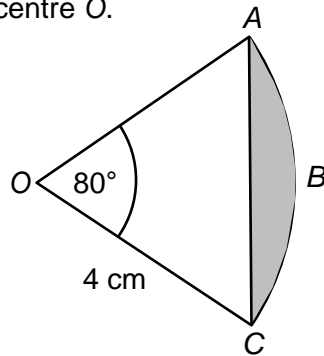
Answer _____ cm



Turn over ►

11

OABC is a sector with centre O.



Not drawn accurately

Calculate the area of the shaded region.

[4 marks]

$$\begin{aligned} \text{Area of sector} &= \frac{80}{360} \times \pi \times 4^2 \\ &= 11.17010721 \end{aligned}$$

$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2} \times 4 \times 4 \times \sin(80) \\ &= 7.878462024 \end{aligned}$$

$$11.17... - 7.87...$$

Answer

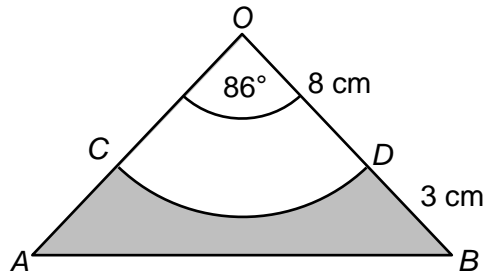
3.3

cm²

12

AOB is an isosceles triangle with OA = OB

COD is a sector, centre O.



Work out the area of the shaded region.

[4 marks]

$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2} \times 11 \times 11 \times \sin(86) \\ &= 60.35262504 \end{aligned}$$

$$\begin{aligned} \text{Area of sector} &= \frac{86}{360} \times \pi \times 8^2 \\ &= 48.03146101 \end{aligned}$$

$$60.35... - 48.03...$$

Answer

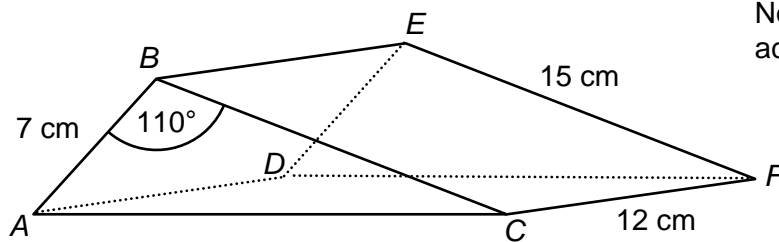
12.3

cm²





13

 $ABCDEF$ is a triangular prism.

The prism has a mass of 0.5 kg.

Calculate the density of the prism in g/cm^3

Give your answer to 3 significant figures.

[5 marks]

$$\text{Area of triangle} = \frac{1}{2} \times 7 \times 15 \times \sin(110^\circ)$$
$$= 49.33386259$$

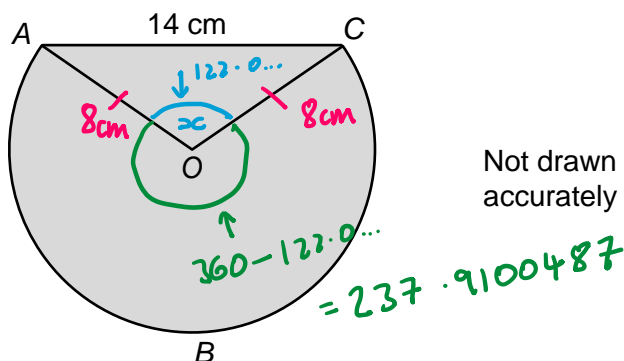
$$\text{Volume of prism} = 49.3... \times 12$$
$$= 592.0063511$$

$$\text{Density} = \frac{500\text{g}}{592.0... \text{cm}^3}$$

$$= 0.8445855337 \text{g/cm}^3$$

Answer 0.845 g/cm^3 

14

 $ABCO$ is a sector with centre O .


The perimeter of triangle AOC is 30 cm.
Calculate the shaded area.

[6 marks]

$$30 - 14 = 16 \quad 16 \div 2 = 8$$

$$\cos(x) = \frac{8^2 + 8^2 - 14^2}{2 \times 8 \times 8}$$

$$\cos(x) = -0.53125$$

$$x = \cos^{-1}(-0.53125)$$

$$x = 122.0899513$$

$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2} \times 8 \times 8 \times \sin(122.0...) \\ &= 27.11088342 \end{aligned}$$

$$\begin{aligned} \text{Area of sector} &= \frac{237.9...}{360} \times \pi \times 8^2 \\ &= 132.8740376 \end{aligned}$$

$$27.11... + 132.87... = 159.984921$$

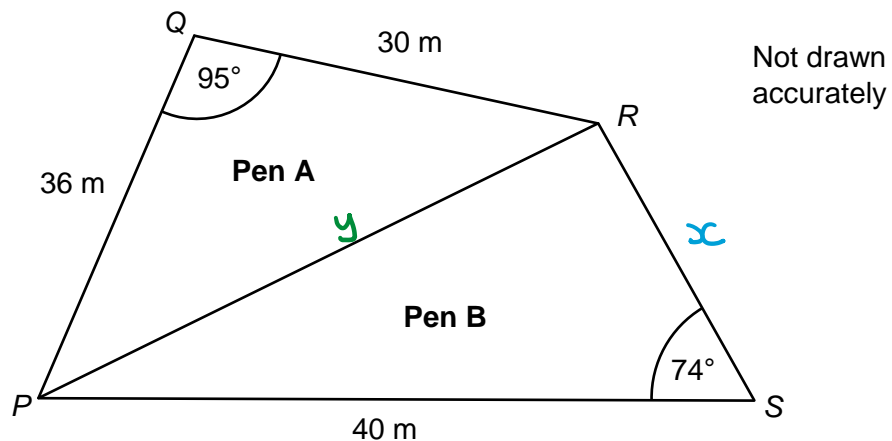
Answer 160.0 cm^2





15

PQRS is a farmer's field that is split into two pens.

Area of **Pen A** = Area of **Pen B**.A fence is placed around the perimeter of the field and along the line PR .

Work out, to the nearest metre, the total length of all the fencing.

[6 marks]

$$\text{Area of pen A} = \frac{1}{2} \times 30 \times 36 \times \sin(95)$$

$$= 537.945137$$

$$\frac{1}{2} \times 40 \times x \times \sin(74) = 537.9...$$

$$20 \sin(74) x = 537.9...$$

$$x = \frac{537.9...}{20 \sin(74)}$$

$$x = 27.98120113$$

$$y^2 = 30^2 + 36^2 - 2 \times 30 \times 36 \times \cos(95)$$

$$y^2 = 2384.256404$$

$$y = \sqrt{2384.256404}$$

$$y = 48.82884808$$

$$30 + 36 + 40 + 27.9... + 48.8...$$

Answer

183

m

12

