

1 Markus makes a steel framework.

The framework is in the shape of the right-angled triangle  $ABC$  shown in the diagram.

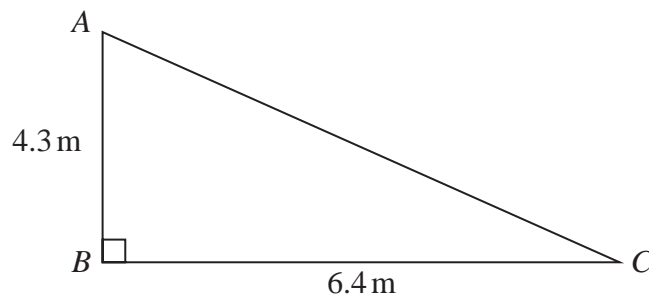


Diagram **NOT**  
accurately drawn

The steel that Markus uses costs \$22 per metre.

The steel can **only** be bought in a length that is a whole number of metres.

Work out the total cost of the steel that Markus buys in order to make the framework.

Finding length AC using Pythagoras' Theorem :

$$AC = \sqrt{4.3^2 + 6.4^2} \quad (1)$$

$$= 7.71 \text{ m} \quad (1)$$

Finding total length of framework :

$$7.71 \text{ m} + 4.3 \text{ m} + 6.4 \text{ m} = 18.4 \text{ m}$$

$\therefore$  Since steel can only be bought in whole number of metres,  
round up 18.4 m to 19 m.

↖ cannot round down to 18 m. Not  
enough for total framework.

$$\text{Total cost of steel} : 19 \times \$22 \quad (1)$$

$$= \$418 \quad (1)$$

\$..... **418**

(Total for Question 1 is 4 marks)

2 The diagram shows an isosceles triangle.

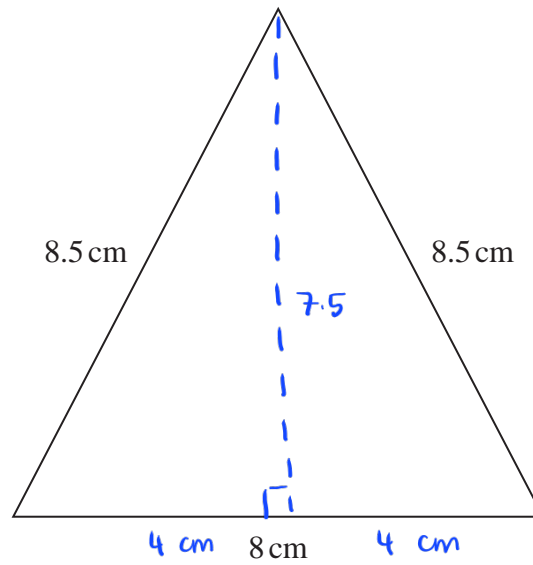
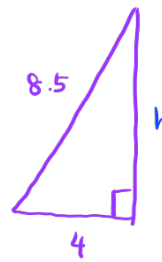


Diagram **NOT**  
accurately drawn

Work out the area of the triangle.

By using Pythagoras' Theorem :

$$\begin{aligned} h &= \sqrt{8.5^2 - 4^2} \\ &= \sqrt{56.25} \text{ ①} \\ &= 7.5 \text{ cm ①} \end{aligned}$$



$$\text{Area of triangle : } \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times 8 \text{ cm} \times 7.5 \text{ cm ①}$$

$$= 30 \text{ cm}^2 \text{ ①}$$

30

.....cm<sup>2</sup>

(Total for Question 2 is 4 marks)

- 3 The diagram shows a rectangle and a diagonal of the rectangle.

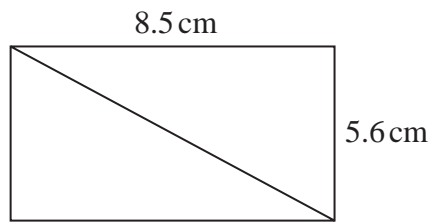


Diagram **NOT**  
accurately drawn

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

Using Pythagoras' theorem :

$$\begin{aligned}\text{diagonal} &= \sqrt{8.5^2 + 5.6^2} \quad (1) \\ &= \sqrt{103.61} \quad (1) \\ &= 10.2 \quad (1)\end{aligned}$$

10.2

..... cm

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(Total for Question 3 is 3 marks)

- 4 The diagram shows a shaded shape  $ABCD$  made from a semicircle  $ABC$  and a right-angled triangle  $ACD$ .

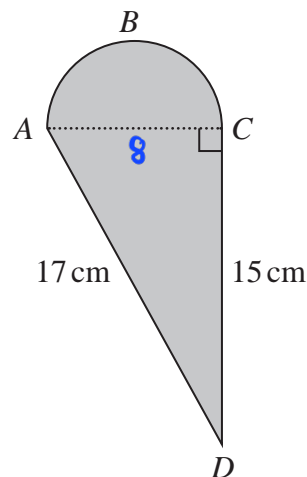


Diagram NOT  
accurately drawn

$AC$  is the diameter of the semicircle  $ABC$ .

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

By using Pythagoras' Theorem :

$$\begin{aligned} AC^2 &= AD^2 - CD^2 \\ AC^2 &= 17^2 - 15^2 \quad (1) \\ AC &= \sqrt{64} \\ &= 8 \text{ cm} \quad (1) \end{aligned}$$

$$\text{Length } ABC = \frac{\pi \times 8}{2} = 4\pi \quad (1)$$

$$\begin{aligned} \text{Perimeter of shaded shape} &: 4\pi + 15 + 17 \quad (1) \\ &= 44.6 \text{ cm} \quad (1) \end{aligned}$$

44.6

..... cm

(Total for Question 4 is 5 marks)

5 The diagram shows a quadrilateral  $ABCD$

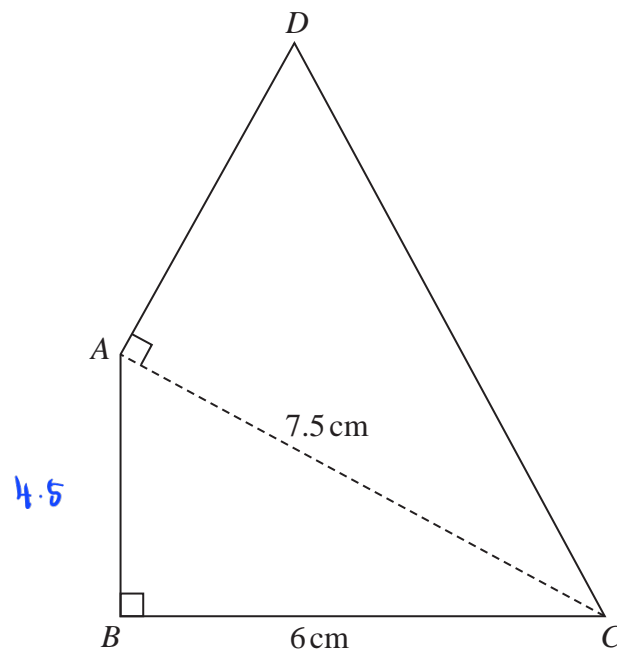


Diagram **NOT**  
accurately drawn

In the diagram,  $ABC$  and  $DAC$  are right-angled triangles.

$$BC = 6 \text{ cm} \quad AC = 7.5 \text{ cm}$$

The area of quadrilateral  $ABCD$  is  $31.5 \text{ cm}^2$

Work out the length of  $AD$

By using Pythagoras' theorem :

$$\text{length } AB = \sqrt{7.5^2 - 6^2} \quad (1)$$

$$= 4.5 \text{ cm} \quad (1)$$

$$\text{Area of triangle } ABC : \frac{1}{2} \times 6 \times 4.5 = 13.5 \text{ cm}^2 \quad (1)$$

$$\text{Area of triangle } ADC : 31.5 - 13.5 = 18 \text{ cm}^2 \quad (1)$$

$$\frac{1}{2} \times AD \times 7.5 = 18$$

$$AD = \frac{18}{7.5} \times 2 \quad (1)$$

$$= 4.8 \text{ cm} \quad (1)$$

4.8

..... cm

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(Total for Question 5 is 6 marks)

- 6 The shaded shape is made using three identical right-angled triangles and a square.

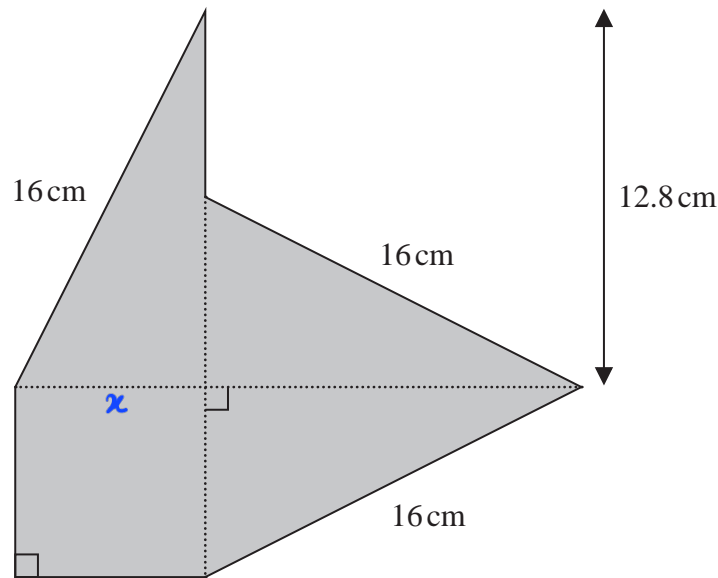


Diagram **NOT**  
accurately drawn

Work out the perimeter of the shaded shape.

$$x^2 = 16^2 - 12.8^2$$

$$= 92.16 \quad (1)$$

$$x = \sqrt{92.16} \quad (1)$$

$$= 9.6$$

$$\text{Perimeter} = 16 + 9.6 + 9.6 + 16 + 16 + (12.8 - 9.6) \quad (1)$$

$$= 70.4 \quad (1)$$

70.4

..... cm

(Total for Question 6 is 4 marks)

7 The diagram shows isosceles triangle  $ABC$

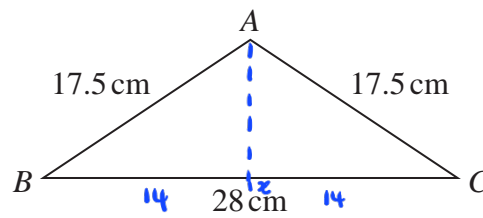


Diagram **NOT**  
accurately drawn

$$AB = AC = 17.5 \text{ cm}$$

$$BC = 28 \text{ cm}$$

Calculate the area of triangle  $ABC$

$$\begin{aligned} \text{Ax} &= \sqrt{17.5^2 - 14^2} \quad (1) \\ &= \sqrt{110.25} \\ &= 10.5 \quad (1) \end{aligned}$$

$$\begin{aligned} \text{Area } ABC &= 2 \times \frac{1}{2} \times 10.5 \times 14 \quad (1) \\ &= 147 \text{ cm}^2 \quad (1) \end{aligned}$$

147 .....  $\text{cm}^2$

(Total for Question 7 is 4 marks)



8 The diagram shows an isosceles triangle  $ABC$

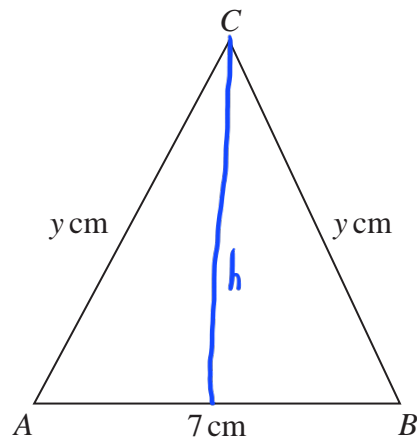


Diagram **NOT**  
accurately drawn

$$AB = 7\text{ cm} \quad AC = BC = y\text{ cm}$$

The area of the triangle is  $42\text{ cm}^2$

Work out the value of  $y$

$$\text{Area} : \frac{1}{2} \times 7 \times h = 42$$

$$h = 12 \quad (1)$$

$$y^2 = 12^2 + 3.5^2 \quad (1)$$

$$y = \sqrt{12^2 + 3.5^2} \quad (1)$$

$$= 12.5 \quad (1)$$

$$y = 12.5$$

(Total for Question 8 is 4 marks)

- 9 The diagram shows an isosceles triangle, with base length 24 cm.

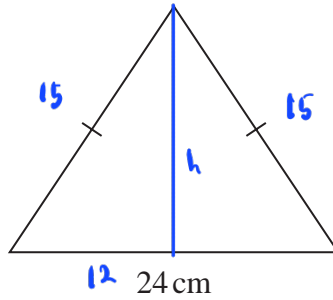


Diagram **NOT**  
accurately drawn

The perimeter of the triangle is 54 cm.

Work out the area of the triangle.

$$2x + 24 = 54$$

$$x = 15 \quad (1)$$

$$h^2 = 15^2 - 12^2 \quad (1)$$

$$h = \sqrt{81} \quad (1)$$

$$= 9$$

$$\text{Area} = \frac{1}{2} \times 9 \times 24 \quad (1)$$

$$= 108 \quad (1)$$

108

..... cm<sup>2</sup>

(Total for Question 9 is 5 marks)

- 10 The diagram shows a shape made up of three semicircles, enclosing a right-angled triangle.

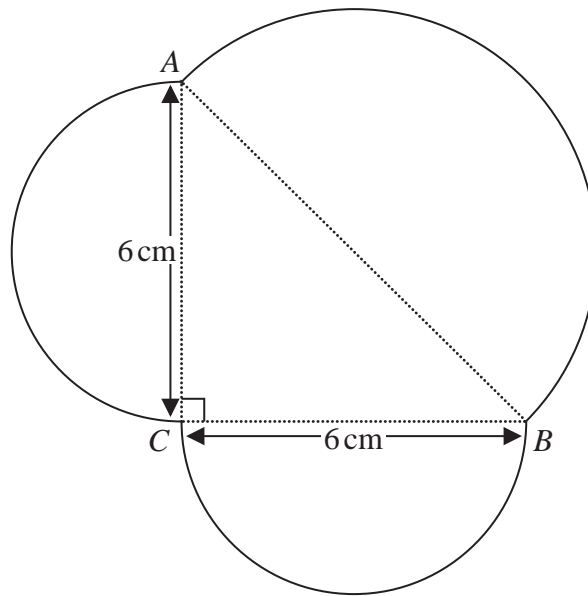


Diagram **NOT**  
accurately drawn

$AB$ ,  $BC$  and  $CA$  are each the diameter of a semicircle.

$$BC = CA = 6 \text{ cm.}$$

Work out the perimeter of the shape.

Give your answer correct to one decimal place.

$$AB^2 = 6^2 + 6^2$$

$$AB^2 = 72 \quad (1)$$

$$AB = \sqrt{72} = 8.48 \dots \quad (1)$$

$$\text{Perimeter} = \frac{1}{2} \times \pi \times 6 + \frac{1}{2} \times \pi \times 6 + \frac{1}{2} \times \pi \times 8.48 \dots \quad (1)$$

$$= 3\pi + 3\pi + 4.24\pi \quad (1)$$

$$= 10.24\pi$$

$$= 32.17 \dots$$

$$\approx 32.2 \text{ (1 d.p.)}$$

(1)

32.2

..... cm

(Total for Question 10 is 5 marks)

- 11 The diagram shows a shaded shape  $AEB CD$  made by removing triangle  $AEB$  from rectangle  $ABCD$

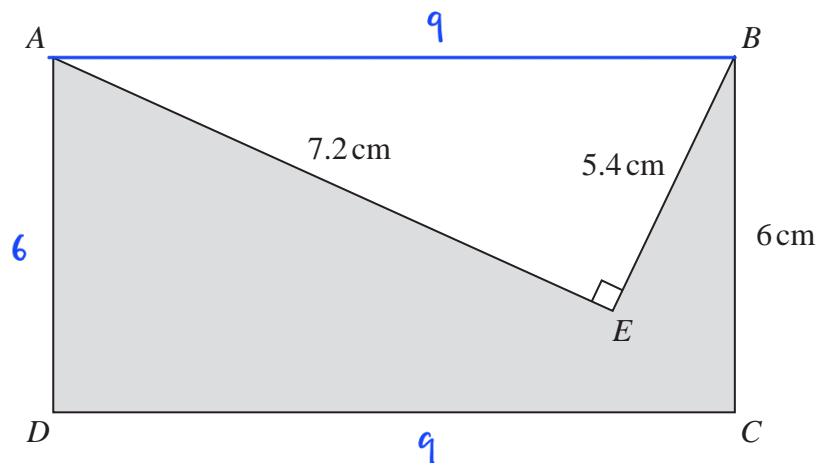


Diagram **NOT**  
accurately drawn

$$AE = 7.2 \text{ cm} \quad BE = 5.4 \text{ cm} \quad BC = 6 \text{ cm} \quad \text{angle } AEB = 90^\circ$$

Work out the perimeter of the shaded shape.

$$\begin{aligned} AB^2 &= 7.2^2 + 5.4^2 \\ &= 81 \quad (1) \\ AB &= \sqrt{81} = 9 \quad (1) \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 6 + 7.2 + 5.4 + 6 + 9 \quad (1) \\ &= 33.6 \quad (1) \end{aligned}$$

33.6 cm

(Total for Question 11 is 4 marks)