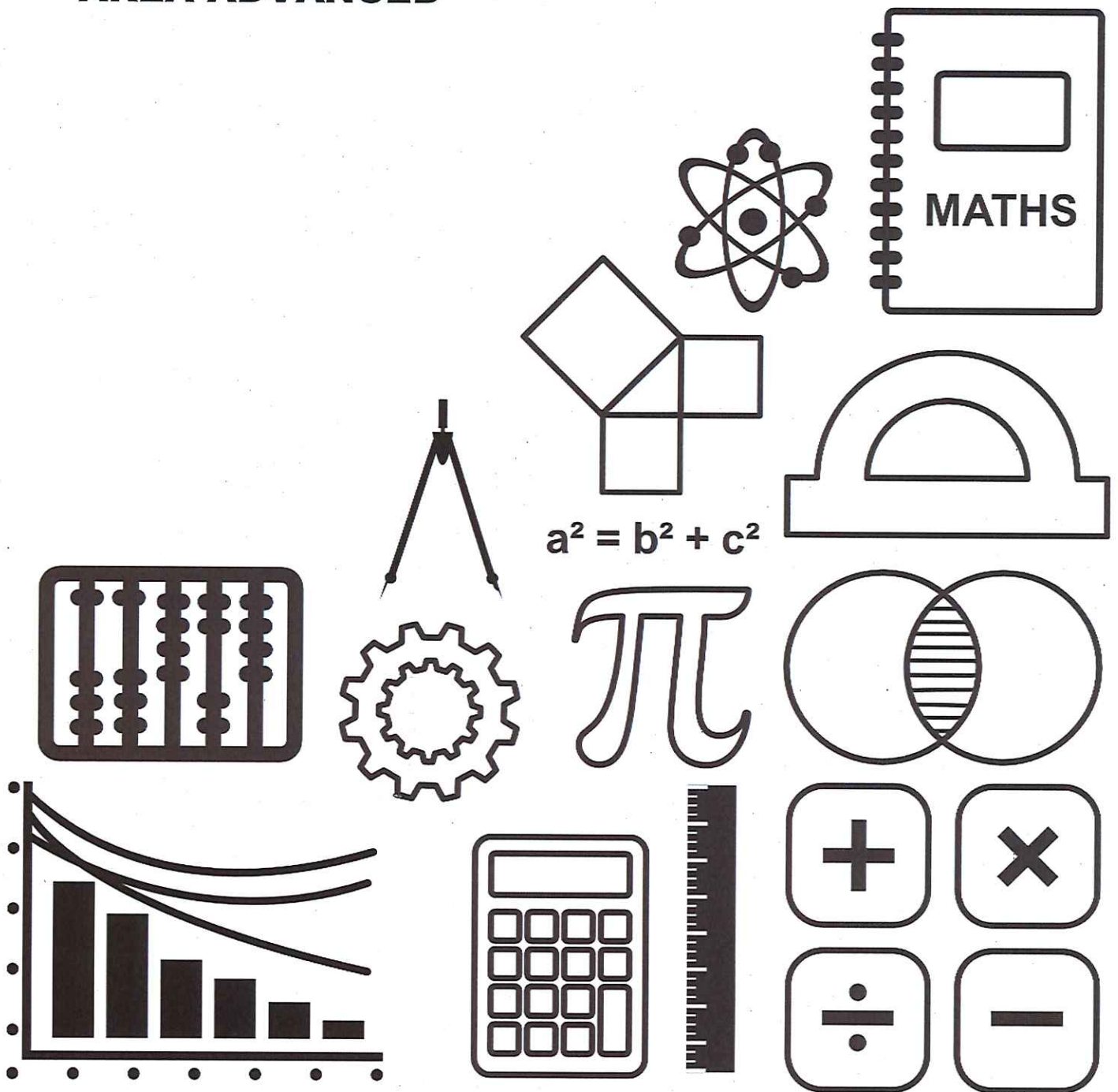


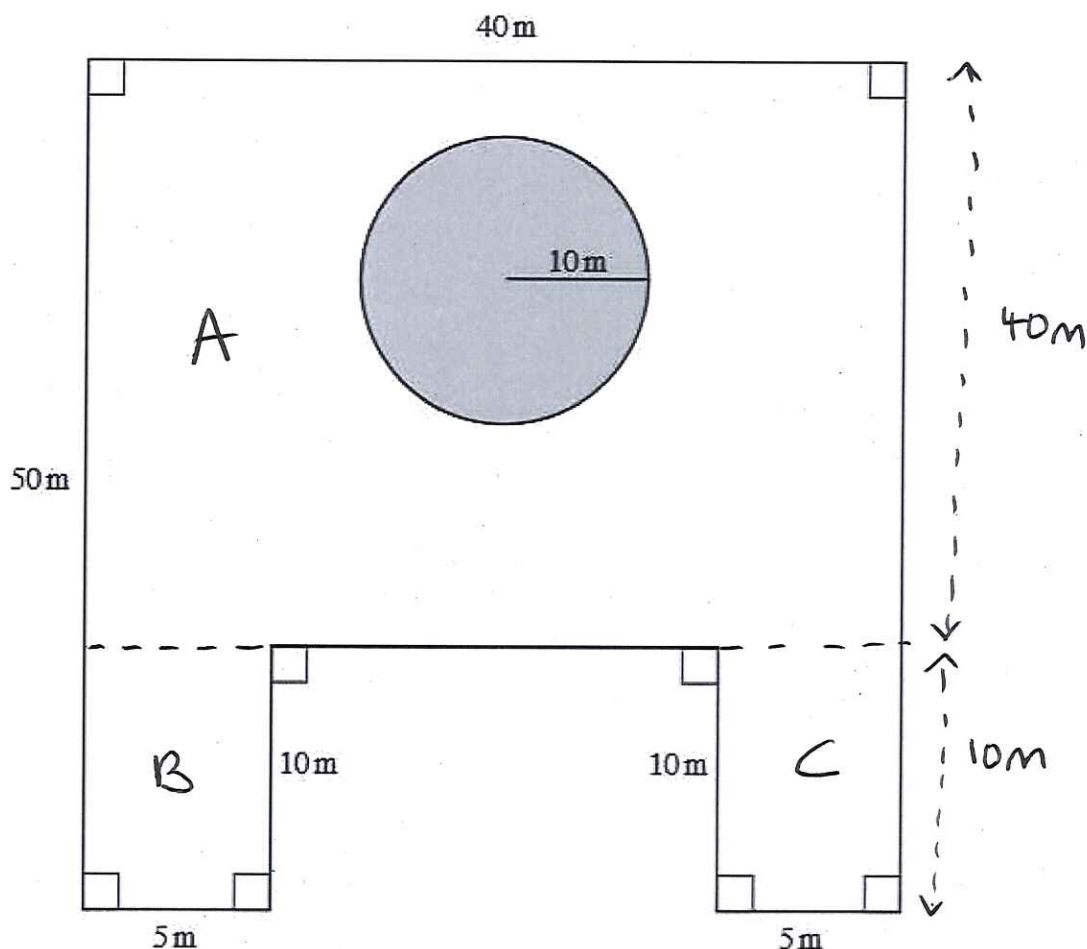
MATHSDIY

GCSE TOPIC BOOKLET AREA ADVANCED

SOLUTIONS



1. The following diagram shows a paved area with a circular pond of radius 10 m.



Using the value of π as 3.14, calculate the area of the paved surface clearly indicating the units of your answer.

$$\text{Area A (including pond)} = 40 \times 40 = 1600 \text{ m}^2$$

$$\text{Area B} = \text{Area C} = 10 \times 5 = 50 \text{ m}^2$$

$$\therefore \text{Total area (including pond)} = 1600 + 50 + 50 = 1700 \text{ m}^2$$

$$\text{Area of pond} = \pi r^2 = \pi \times 10^2 = 3.14 \times 10^2 = 314 \text{ m}^2$$

$$\text{Paved Surface Area} = 1700 - 314 = 1386 \text{ m}^2$$

[6]

2. D

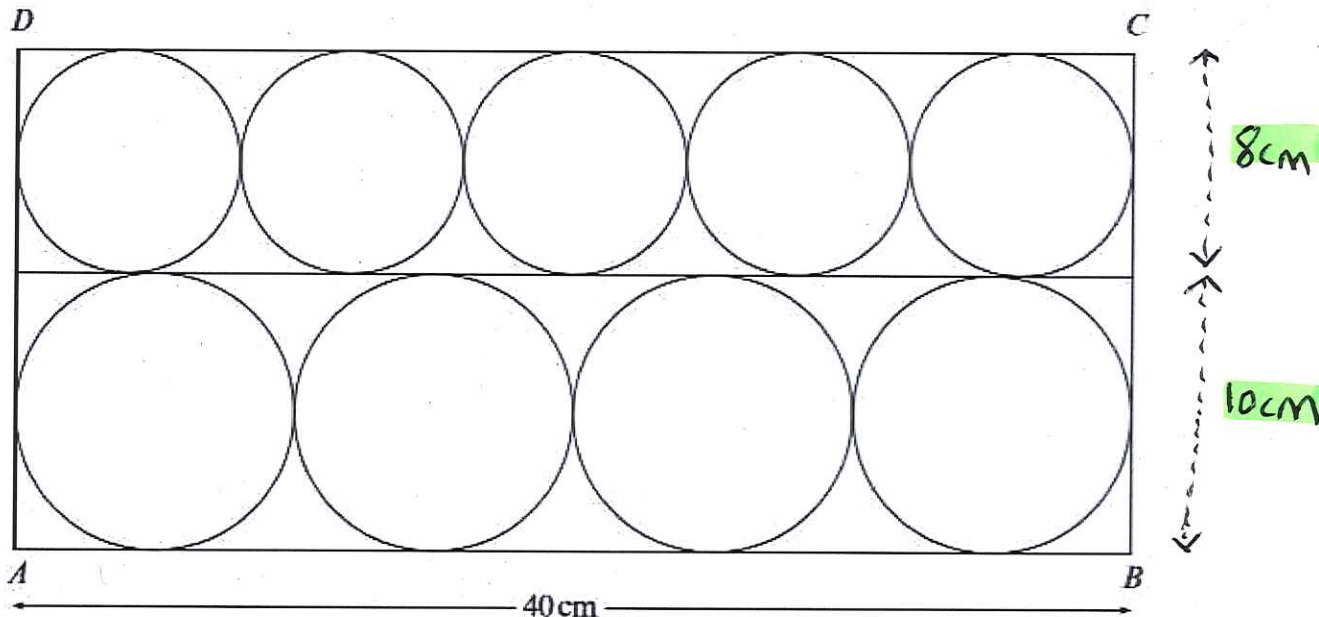


Diagram not drawn to scale.

The diagram shows a set of five identical circles and a set of four other identical circles fitting exactly into the rectangle ABCD.

The length of AB is 40 cm.

Calculate the area of the rectangle ABCD.

$$\text{Diameter of one larger circle} = 40 \div 4 = \underline{10 \text{ cm}}$$

$$\text{Diameter of one smaller circle} = 40 \div 5 = \underline{8 \text{ cm}}$$

$$\underline{\text{Length BC}} = 10 + 8 = \underline{18 \text{ cm}}$$

$$\text{Area of rectangle} = L \times W = 40 \times 18 = \underline{720 \text{ cm}^2}$$

[5]

3. The following diagram shows a card in the shape of a trapezium, with a circular hole of radius 10 cm cut out of the card.
The lengths of the parallel sides of the trapezium are 55 cm and 45 cm and the perpendicular distance between the parallel sides is 30 cm.

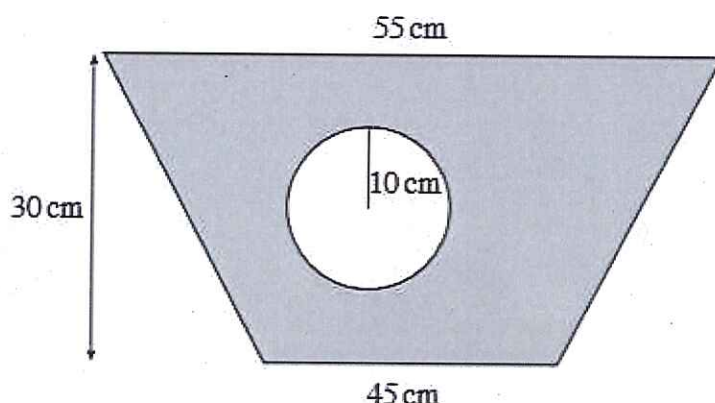


Diagram not drawn to scale.

calculate

the area of the shaded part of the card. = $\text{area of trapezium} - \text{area of circle}$

$$\text{Area of trapezium} = \frac{1}{2}(a+b) \times h = \frac{1}{2}(55+45) \times 30$$

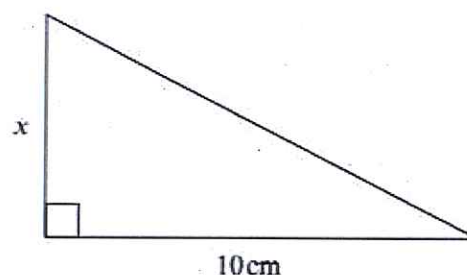
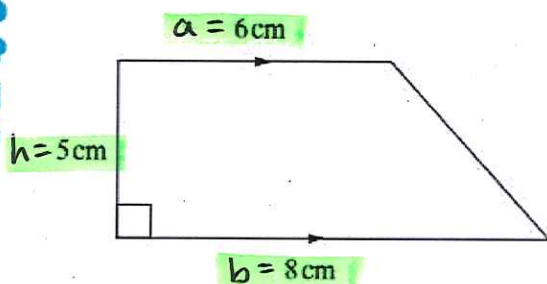
$$= 1500 \text{ cm}^2$$

$$\text{Area of circle} = \pi r^2 = \pi \times 10 \times 10 = 314.16 \text{ cm}^2 \text{ (2dp)}$$

$$\text{Shaded area} = 1500 - 314.16 = 1185.84 \text{ cm}^2 \text{ (2dp)}$$

[5]

4. (a) The triangle and trapezium below both have the same area.



Diagrams not drawn to scale

Calculate the length of the side marked x .

$$\begin{aligned} \text{Area trapezium} &= \frac{1}{2}(a+b) \times h \\ &= \frac{1}{2}(6+8) \times 5 = \underline{\underline{35\text{cm}^2}} \end{aligned}$$

$$\text{Area of triangle} = \frac{1}{2} b \times h$$

$$35 = \frac{1}{2} b \times h$$

$$\underline{\underline{70 = b \times h}}$$

$$70 = 10 \times x$$

$$\underline{\underline{x = 7\text{cm}}}$$

[4]

5.

Two friends, Kim and Terry, are planning a camping holiday.

- (a) The floor of their tent can be thought of as a rectangle. The tent has a ground area of 5.12m^2 .

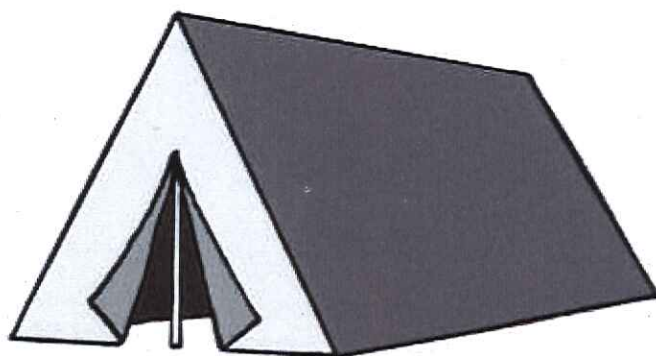
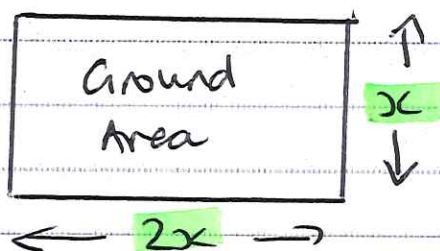


Diagram not drawn to scale

The length of the tent is twice as long as the width.
Calculate the length and width of the floor of the tent.



$$x \times 2x = 5.12$$

$$2x^2 = 5.12$$

$$x^2 = 2.56$$

$$x = \sqrt{2.56}$$

$$x = 1.6$$

Length 3.2 metres

Width 1.6 metres

[4]

6. The diagram shows a square drawn inside a circle.

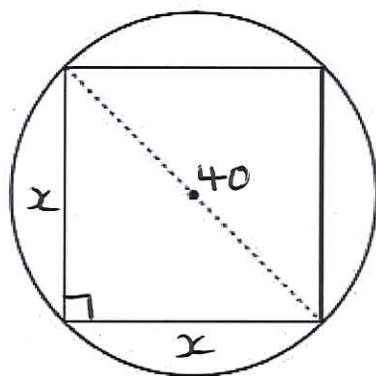


Diagram not drawn to scale.

The diameter of the circle is 40 cm.
Find the area of the square.

Using pythagoras

$$x^2 + x^2 = 40^2$$

$$2x^2 = 1600$$

$$x^2 = 800$$

$$x = 20\sqrt{2} \text{ cm}$$

$$x = \underline{\underline{28.28 \text{ cm (2dp)}}}$$

$$\begin{aligned} \text{Area of square} &= 20\sqrt{2} \times 20\sqrt{2} \\ &= \underline{\underline{800 \text{ cm}^2}} \end{aligned}$$

[4]

7.

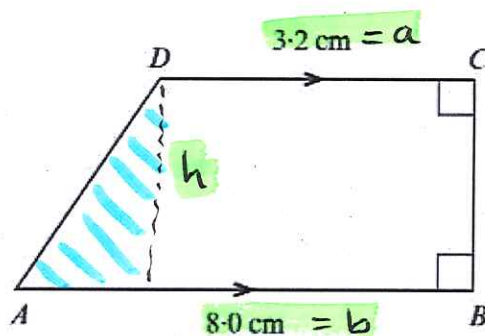


Diagram not drawn to scale

Given that the area of the trapezium $ABCD$ is 30.8 cm^2 , find the length of AD .

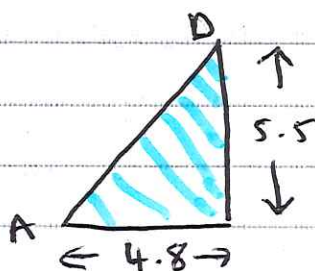
$$\text{Area trapezium} = \frac{1}{2}(a+b)h$$

$$30.8 = \frac{1}{2}(8.0 + 3.2)h$$

$$30.8 = 5.6h$$

$$\frac{30.8}{5.6} = h, \quad \underline{\underline{h = 5.5 \text{ cm}}}$$

Now consider



Using pythagoras

$$AD^2 = 5.5^2 + 4.8^2$$

$$AD^2 = 53.29$$

$$\underline{\underline{AD = 7.3 \text{ cm}}}$$

[7]