

# 2D Shapes

## Perimeters & Areas

### Question Paper 9

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Mensuration (Perimeters, Areas & Volumes)
Sub-Topic	2D Shapes: Perimeters & Areas
Booklet	Question Paper 9

**Time Allowed:** 62 minutes

**Score:** /51

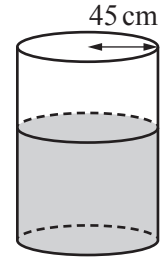
**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

- 1 (a) A cylindrical tank contains  $180\,000\text{ cm}^3$  of water.  
The radius of the tank is 45 cm.

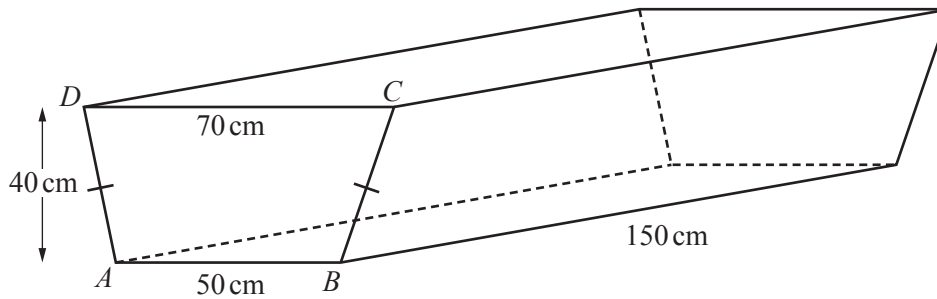
Calculate the height of water in the tank.



NOT TO SCALE

Answer(a) ..... cm [2]

- (b)



NOT TO SCALE

The diagram shows an empty tank in the shape of a horizontal prism of length 150 cm.  
The cross section of the prism is an isosceles trapezium  $ABCD$ .  
 $AB = 50\text{ cm}$ ,  $CD = 70\text{ cm}$  and the vertical height of the trapezium is 40 cm.

- (i) Calculate the volume of the tank.

Answer(b)(i) .....  $\text{cm}^3$  [3]

- (ii) Write your answer to **part (b)(i)** in litres.

Answer(b)(ii) ..... litres [1]

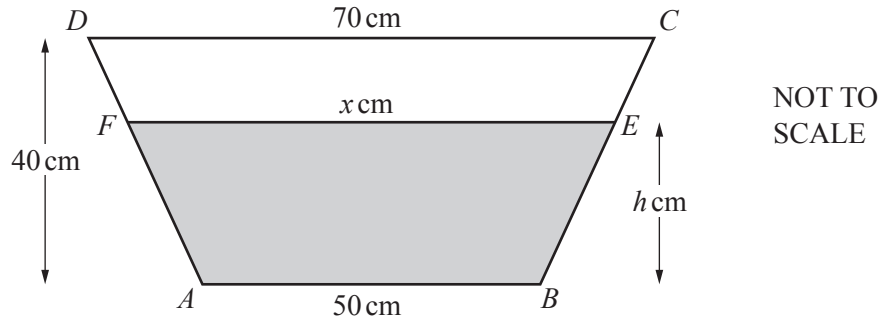
- (c) The  $180\,000\text{ cm}^3$  of water flows from the tank in **part (a)** into the tank in **part (b)** at a rate of  $15\text{ cm}^3/\text{s}$ .

Calculate the time this takes.

Give your answer in hours and minutes.

Answer(c) ..... h ..... min [3]

(d)



The  $180\,000\text{ cm}^3$  of water reaches the level  $EF$  as shown above.  
 $EF = x\text{ cm}$  and the height of the water is  $h\text{ cm}$ .

(i) Using the properties of similar triangles, show that  $h = 2(x - 50)$ .

*Answer(d)(i)*

[2]

(ii) Using  $h = 2(x - 50)$ , show that the shaded area, in  $\text{cm}^2$ , is  $x^2 - 2500$ .

*Answer(d)(ii)*

[1]

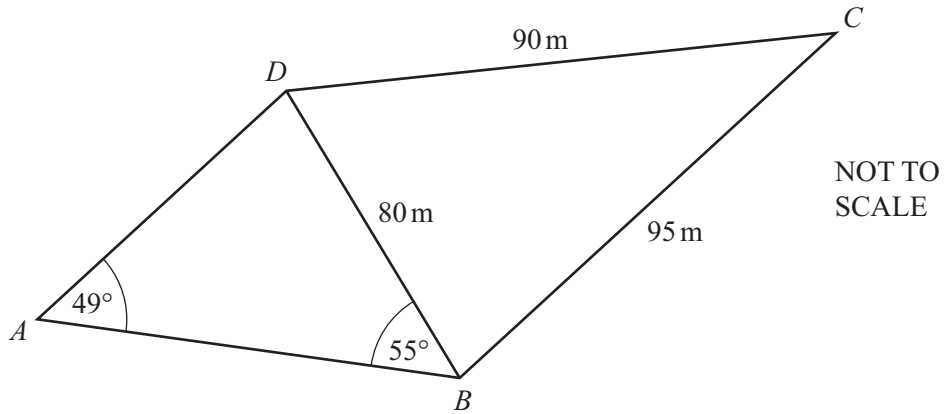
(iii) Find the value of  $x$ .

*Answer(d)(iii)*  $x = \dots\dots\dots$  [2]

(iv) Find the value of  $h$ .

*Answer(d)(iv)*  $h = \dots\dots\dots$  [1]

2



The diagram shows a quadrilateral  $ABCD$ .  
 Angle  $BAD = 49^\circ$  and angle  $ABD = 55^\circ$ .  
 $BD = 80\text{ m}$ ,  $BC = 95\text{ m}$  and  $CD = 90\text{ m}$ .

(a) Use the sine rule to calculate the length of  $AD$ .

Answer(a)  $AD = \dots\dots\dots\text{ m}$  [3]

(b) Use the cosine rule to calculate angle  $BCD$ .

Answer(b) Angle  $BCD = \dots\dots\dots$  [4]

(c) Calculate the area of the quadrilateral  $ABCD$ .

*Answer(c)* .....  $\text{m}^2$  [3]

(d) The quadrilateral represents a field.  
Corn seeds are sown across the whole field at a cost of \$3250 per hectare.

Calculate the cost of the corn seeds used.  
1 hectare =  $10\,000\text{m}^2$

*Answer(d)* \$ ..... [3]

- 3 (a) (i) Show that the equation  $\frac{7}{x+4} + \frac{2x-3}{2} = 1$  can be simplified to  $2x^2 + 3x - 6 = 0$ .

*Answer(a)(i)*

[3]

- (ii) Solve the equation  $2x^2 + 3x - 6 = 0$ .

Show all your working and give your answers correct to 2 decimal places.

*Answer(a)(ii)*  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [4]

- (b) The **total** surface area of a cone with radius  $x$  and slant height  $3x$  is equal to the area of a circle with radius  $r$ .

Show that  $r = 2x$ .

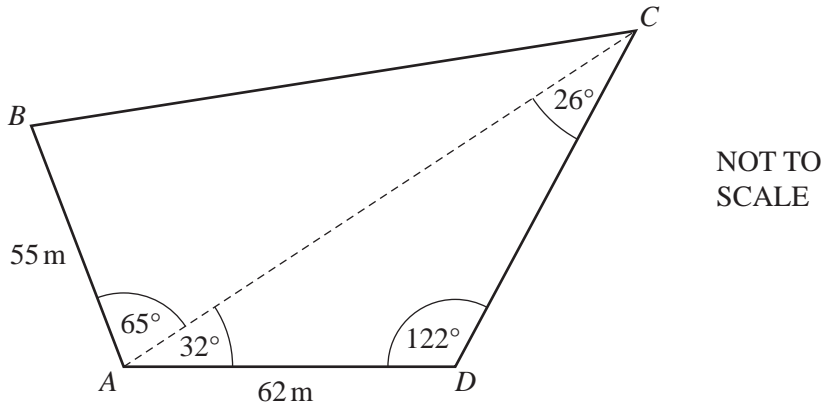
[The curved surface area,  $A$ , of a cone with radius  $r$  and slant height  $l$  is  $A = \pi rl$ .]

*Answer(b)*

[4]

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- 4 A field,  $ABCD$ , is in the shape of a quadrilateral.  
A footpath crosses the field from  $A$  to  $C$ .



- (a) Use the sine rule to calculate the distance  $AC$  and show that it rounds to  $119.9\text{ m}$ , correct to 1 decimal place.

*Answer(a)*

[3]

- (b) Calculate the length of  $BC$ .

*Answer(b)*  $BC = \dots\dots\dots\text{ m}$  [4]

(c) Calculate the area of triangle  $ACD$ .

*Answer(c)* .....  $\text{m}^2$  [2]

(d) The field is for sale at \$4.50 per square metre.

Calculate the cost of the field.

*Answer(d)* \$ ..... [3]