

# 3.1 Geometry Toolkit

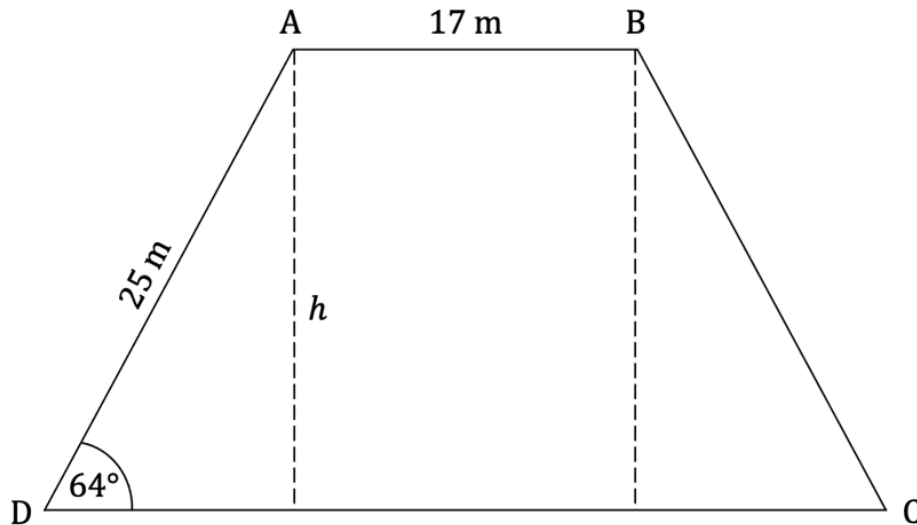
## Question Paper

Course	DPIB Maths
Section	3. Geometry & Trigonometry
Topic	3.1 Geometry Toolkit
Difficulty	Medium

**Time allowed:** 90  
**Score:** /68  
**Percentage:** /100

**Question 1a**

ABCD is an isosceles trapezoid where  $AB = 17\text{ m}$  and  $AD = BC = 25\text{ m}$ , as shown in the diagram below.



(a) Find the height,  $h$ , of the trapezoid.

[2 marks]

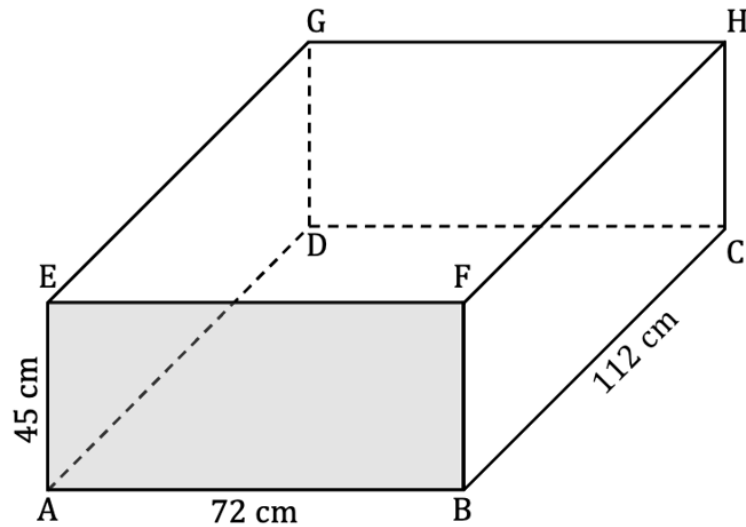
**Question 1b**

(b) Find the area of the trapezoid.

[4 marks]

**Question 2a**

The diagram below shows a cuboid measuring  $45\text{ cm} \times 72\text{ cm} \times 112\text{ cm}$ .



- (a) (i) Calculate the distance from A to F.
- (ii) Calculate the distance from B to H.
- (iii) Calculate the distance from A to C.

[3 marks]

**Question 2b**

(b) Calculate the distance from B to G.

[2 marks]

**Question 3a**

Point A has coordinates  $(4, -6)$  and point B has coordinates  $(8, 6)$ .

(a) Calculate the distance of the line segment AB.

[2 marks]

**Question 3b**

(b) Find the equation of the line connecting points A and B.

Give your answer in the form  $y = mx + c$ .

[2 marks]

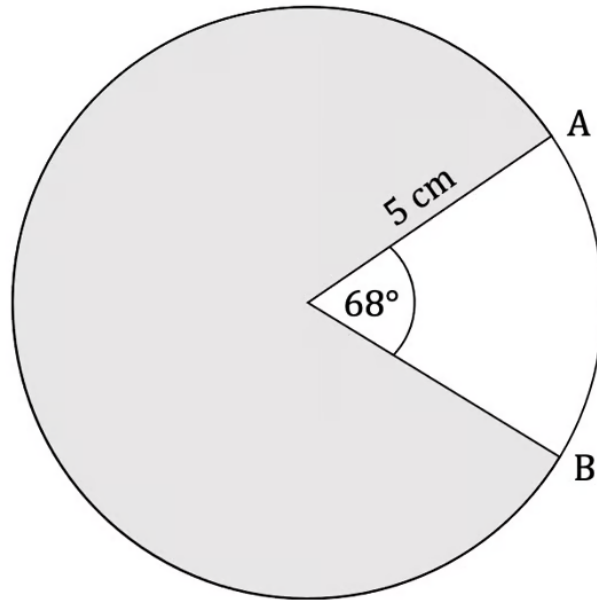
**Question 3c**

- (c) (i) Find the midpoint of [AB].
- (ii) Find the equation of the perpendicular bisector to the line segment AB.  
Give your answer in the form  $y = mx + c$ .

**[4 marks]**

**Question 4a**

The diagram below shows a circle with a  $68^\circ$  sector cut from it. The radius of the circle is 5 cm.



(a) Find the length of

- (i) the minor arc AB
- (ii) the major arc AB.

[3 marks]

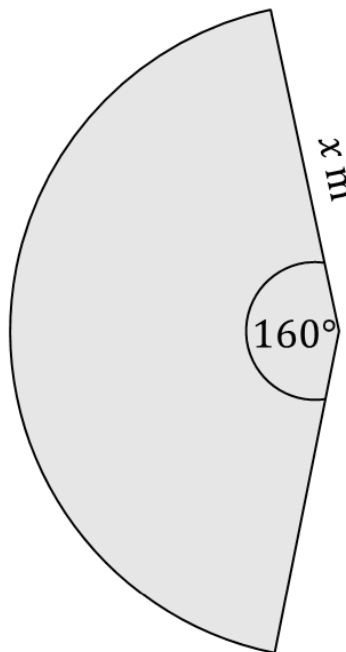
**Question 4b**

(b) Find the area of the shaded region.

[3 marks]

**Question 5a**

A lawn sprinkler sprays water over a lawn covering an arc of  $160^\circ$  with a maximum spray distance of  $x$  m as shown in the diagram below. The lawn sprinkler waters  $20 \text{ m}^2$  of the lawn.



(a) Calculate the value of  $x$ .

[4 marks]

**Question 5b**

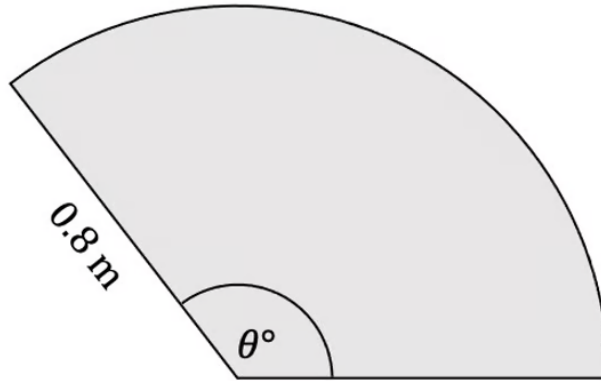
(b) Calculate the length of the outer arc.

**[3 marks]**



**Question 6a**

A windscreen wiper blade is 0.8 m long. When in motion the blade moves through an arc of  $\theta^\circ$  and wipes an area of  $\frac{4}{15}\pi \text{ m}^2$ .



(a) Calculate the value of  $\theta$ .

[4 marks]

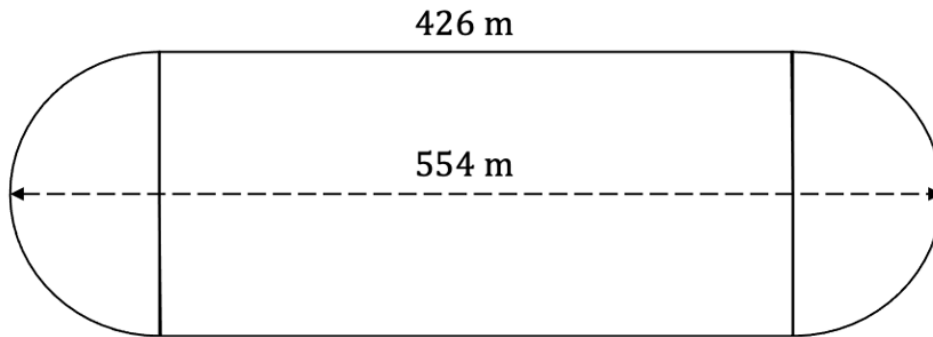
**Question 6b**

(b) Calculate the length travelled by the outer edge of the blade.

[3 marks]

**Question 7a**

The diagram below shows a dirt racetrack where the straights are 426 m long and the longest distance from one end of the track to the other is 554 m.



(a) Find the total distance around the racetrack.

[3 marks]

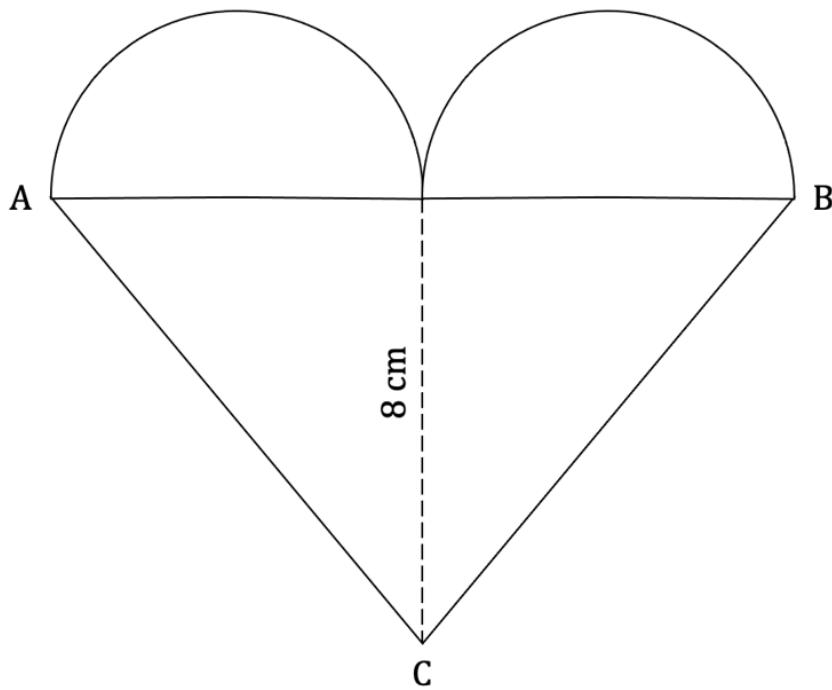
**Question 7b**

(b) Find the total area enclosed by the racetrack.

[4 marks]

**Question 8a**

The diagram below shows a cookie cutter in the shape of a heart constructed from a triangle and two identical semi circles. The height of the triangle is 8 cm and its base AB is 13.34 cm.



(a) Find the length of the line AC.

[2 marks]

**Question 8b**

(b) Calculate the total area of the heart.

[4 marks]

**Question 8c**

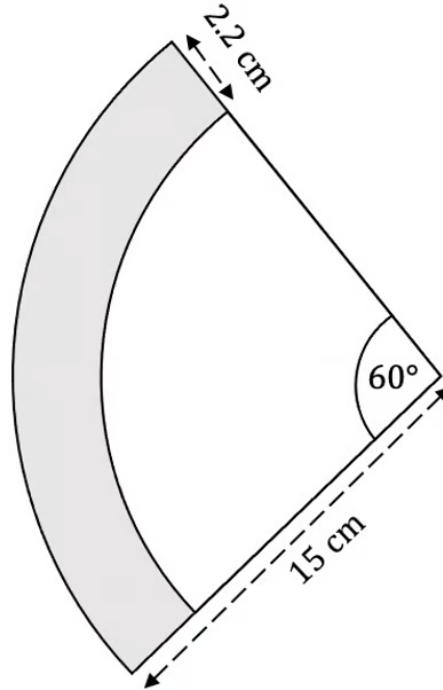
Bob makes some cookie dough and rolls it out on his kitchen bench. The cookie dough covers  $1314 \text{ cm}^2$ .

(c) Find the number of **full** cookies Bob can cut from the dough.

[2 marks]

**Question 9a**

The diagram below shows a slice of pizza that forms a sector of a circle with an arc of  $60^\circ$  and radius of 15 cm. The width of the crust is 2.2 cm.



(a) Find the perimeter of the slice of pizza.

[3 marks]

**Question 9b**

(b) Find the area of the crust.

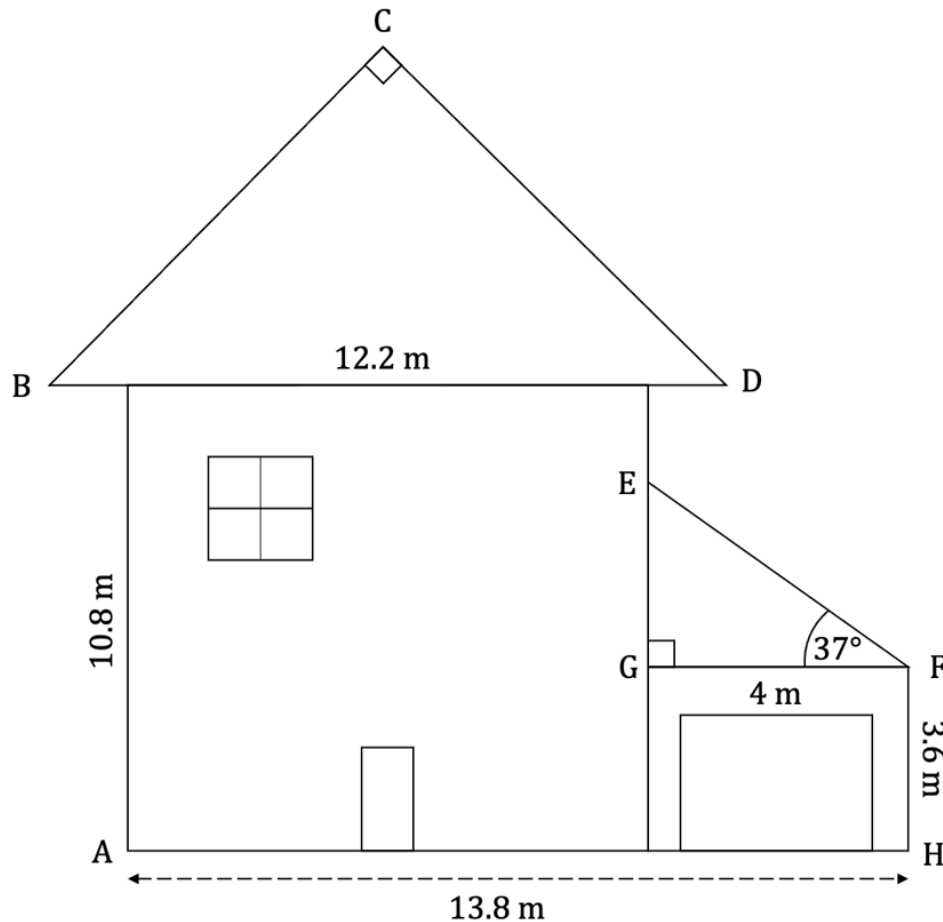
[3 marks]



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Question 10a

The diagram below shows an architect's drawing of the front view of a house. The house is in the shape of a rectangle with a height of 10.8 m and has a roof in the shape of a right-angled isosceles triangle,  $BCD$ .  $BD = 12.2$  m, angle  $\hat{BCD} = 90^\circ$ . Next to the house is a garage in the shape of a rectangle measuring 4 m  $\times$  3.6 m with a roof in the shape of a right-angled triangle with a base,  $GF$ , of 4 m and angle  $\hat{EFG} = 37^\circ$ .



(a) Find the length of

- (i)  $EG$
- (ii)  $BC$ .

[2 marks]

**Question 10b**

(b) Find the total area of the front view of the house.

[6 marks]