3.1 Geometry Toolkit

Question Paper

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

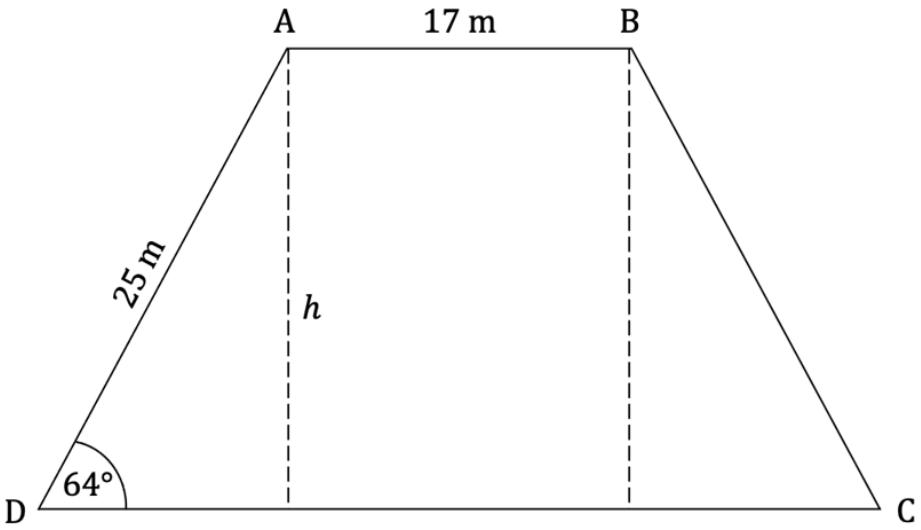
Time allowed: 80

Score: /66

Percentage: /100

Question 1a

ABCD is an isosceles trapezoid where AB = 17 m and AD = BC = 25 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 2

The distance between Ho Chi Minh City and Hong Kong is known to be 1500 km. The bearing of Hong Kong from Ho Chi Minh City is 046°. Another city, Brisbane, is 6500 km from Ho Chi Minh City on a bearing of 136°. Calculate the distance between Hong Kong and Brisbane.

[3 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

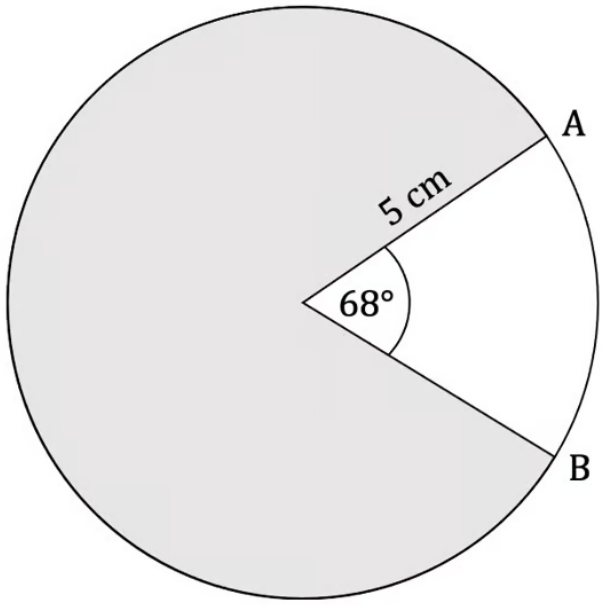
(c) (i) Find the midpoint of [AB].

(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° 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]

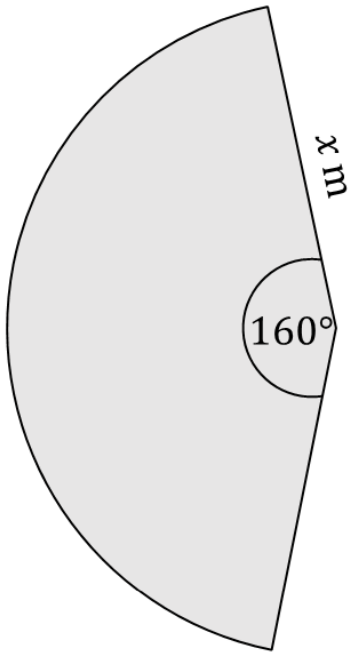
Question 4b

(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° with a maximum spray distance of x m as shown in the diagram below. The lawn sprinkler waters 20 m^2 of the lawn.



(a) Calculate the value of x.

[4 marks]

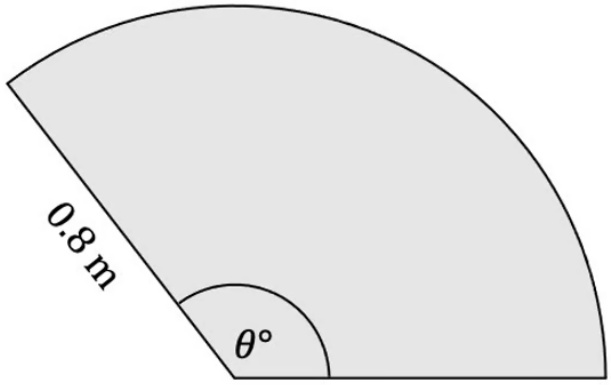
Question 5b

(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 $\theta°$ and wipes an area of $\frac{4}{15}\pi$ m^2.



(a) Calculate the value of θ.

[4 marks]

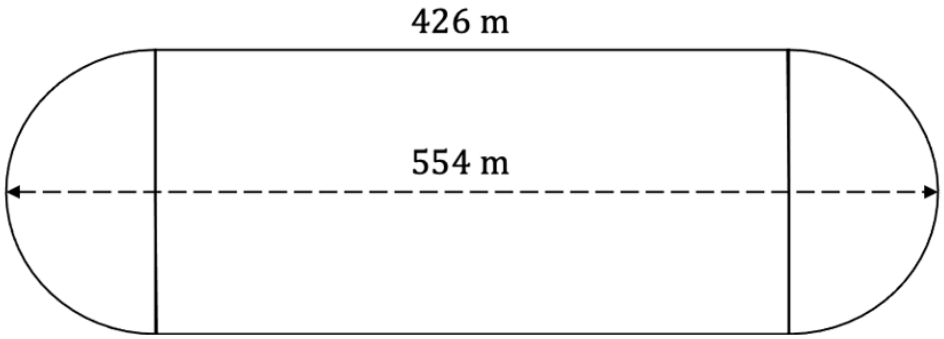
Question 6b

(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 554m.



(a) Find the total distance around the racetrack.

[3 marks]

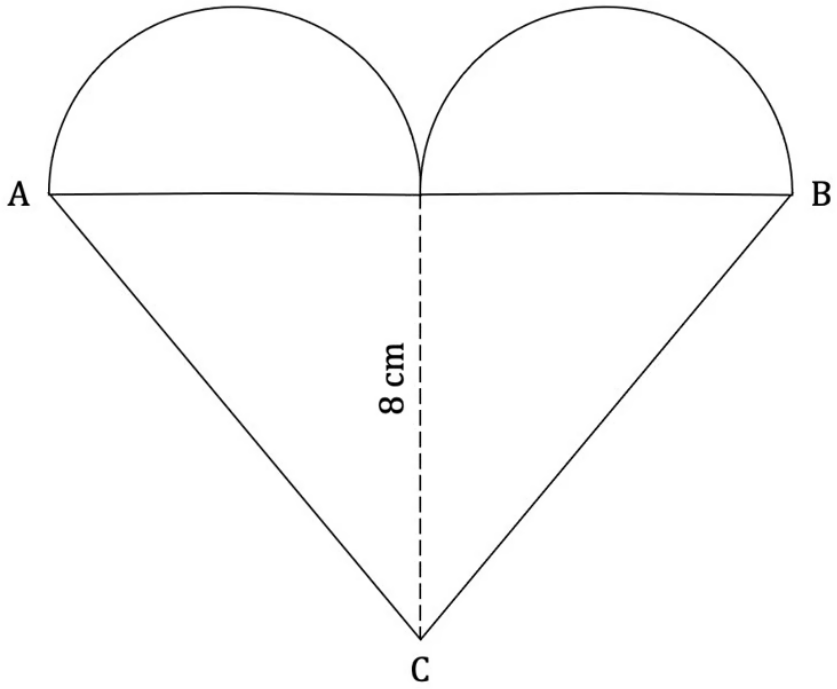
Question 7b

(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

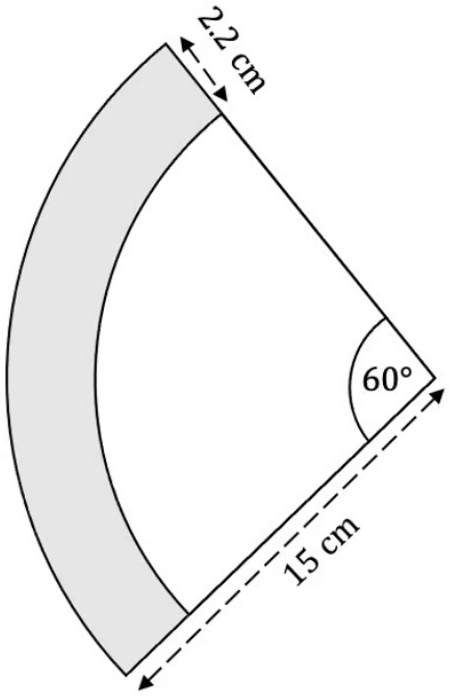
Bob makes some cookie dough and rolls it out on his kitchen bench. The cookie dough covers 1314 cm^2.

(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° 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]

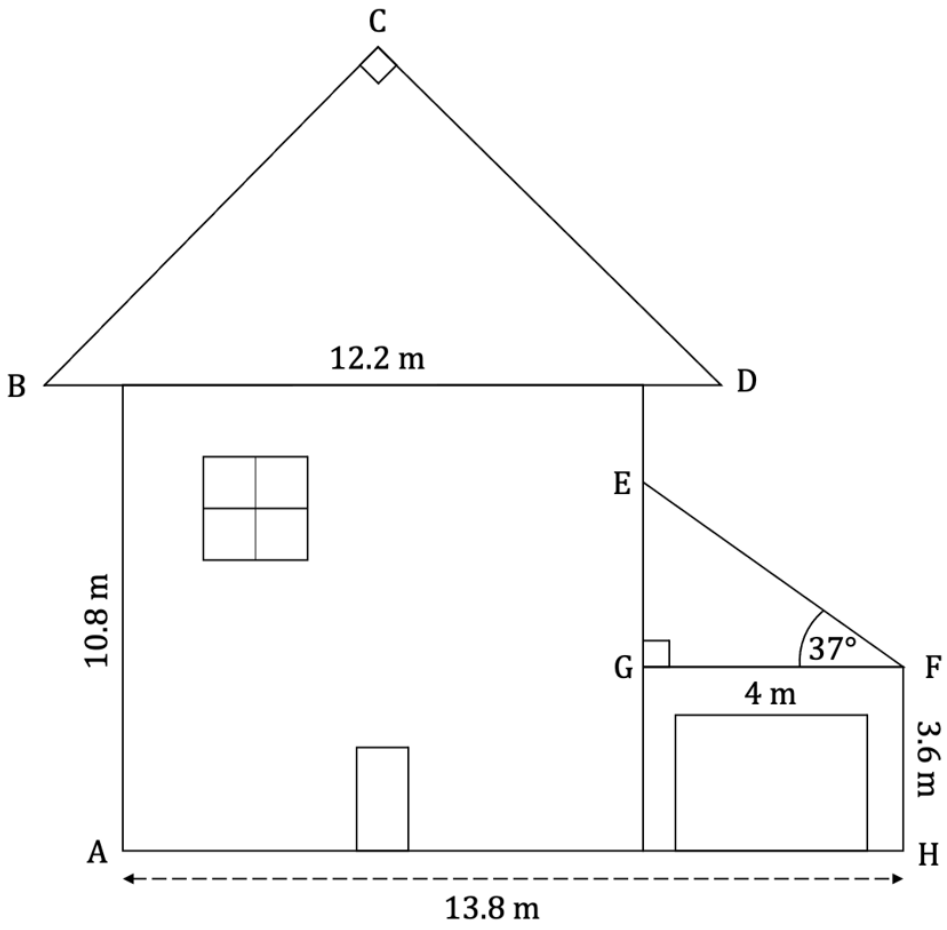
Question 9b

(b) Find the area of the crust.

[3 marks]

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 $B\hat{C}D = 90°$. Next to the house is a garage in the shape of a rectangle measuring 4 m × 3.6 m with a roof in the shape of a right-angled triangle with a base, GF, of 4 m and angle $E\hat{F}G = 37°$.



(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]