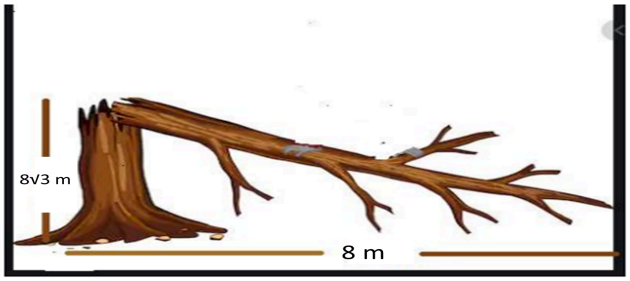
CLASS-X (MATHS) CBT SYLLABUS OCTOBER-2024

- ***SOME APPLICATIONS OF TRIGONOMETRY***
- ***CIRCLES***

Case Study 1:-

Ramesh is having a garden near his vidyalaya. In the garden, there are different types of trees and flower plants. One day due to heavy rain and storm one of the trees got broken as shown in the figure. The height of the unbroken part is $8\sqrt{3}$ m and the broken part of the tree has fallen at 8 m away from the base of the tree.



1. What is the length of the broken part?
   (A) 15 m
   (B) 20 m
   (C) 16 m
   (D) 30 m
2. What was the height of the full tree?
   (A) $8\ (\sqrt{3} + 2\ )$m
   (B) $8\ (2 - \sqrt{3}\ )$m
   (C) 16 m
   (D) 24m
3. The angle formed by the broken part of the tree with ground is
   (A) $90°$
   (B) $30°$
   (C) $60°$
   (D) $45°$
4. What is the area of the formed right angle triangle?
   (A) $64\sqrt{3}$ m^2
   (B) $32\sqrt{3}$ m^2
   (C) $16\sqrt{3}$ m^2
   (D) $8\sqrt{3}$ m^2

5. What is the perimeter of the formed triangle?

(A)16 ($\sqrt{3}$ + 3)m

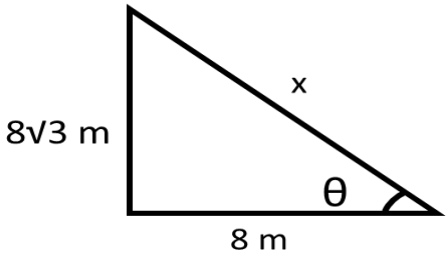
(B) 24 ($\sqrt{3}$ + 3) m

(C) 32m

(D) 8 ($\sqrt{3}$ + 3)m

ANSWER:

1. (C) 16 m



$X^2 = (8\sqrt{3})^2 + (8)^2$

x = 16 m

2. (A) 8 ($\sqrt{3}$ + 2)m

$8\sqrt{3}$ + x = $8\sqrt{3}$ + 16 = 8 ($\sqrt{3}$ + 2)m

3.(C) 60°

tan θ = $\frac{8\sqrt{3}}{8}$ = $\sqrt{3}$ =tan 60° , θ= 60°

4. (B) $32\sqrt{3}$ m^2

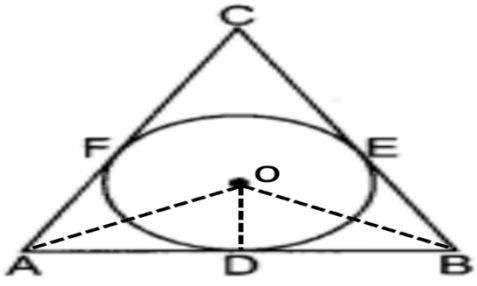
Area = $\frac{1}{2}$ × $8\sqrt{3}$ × 8 = $32\sqrt{3}$ m^2

5. (D) 8 ($\sqrt{3}$ + 3)m

Perimeter= $8\sqrt{3} + 16 + 8$ m = 8 ($\sqrt{3}$ + 3)m

Case Study 2:-

Varun has been selected by his School to design logo for Sports Day T-shirts for students and staff . The logo design is as given in the figure and he is working on the fonts and different colours according to the theme. In given figure, a circle with centre O is inscribed in a ΔABC, such that it touches the sides AB, BC and CA at points D, E and F respectively. The lengths of sides AB, BC and CA are 12 cm, 8 cm and 10 cm respectively



6. Find the length of AD

(A) 7 cm

(B) 8 cm

(C) 5 cm

(D) 9 cm

7. Find the Length of BE

(A) 8 cm

(B) 5 cm

(C) 2 cm

(D) 9 cm

8. Find the length of CF

(A) 9

(B) 5

(C) 2

(D) 3

9. If radius of the circle is 4cm, Find the area of ΔOAB

(A) 20 cm²

(B) 36 cm²

(C) 24 cm²

(D) 48 cm²

10. Find area of ΔABC

(A) 50 cm²

(B) 60 cm²

(C) 100 cm²

(D) 90 cm²

ANSWERS:

6. (A) 7 cm

If AD = x , then AF = x , BD = BE = 12 – x , and CF = CE = 10 – x

BC = BE + CE = 8 , therefore (12 – x) + (10 – x) = 8 $\Rightarrow$ 22 – 2x = 8

$\Rightarrow$11 – x = 4 $\Rightarrow$x = 7 , hence AD = 7.

7. (B) 5cm

BE = BD = 12 – x = 12 – 7 = 5cm

8. (D) 3

CF = CE = 10 – x = 10 – 7 = 3 cm

9. (C) 24cm²

Area of ΔOAB = $\frac{1}{2}\times AB\times OD = \frac{1}{2}\times 12\times 4 = 24$cm²

10. (B) 60 cm²

Area of ΔABC = ar(ΔOAB)+ ar(ΔOBC)+ ar(ΔOAC) = $\frac{1}{2}\times 4(AB + BC + AC)$

$= 2(12 + 10 + 8) = 60$ cm²