Geometry

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1. The angle of elevation of the top of a tower from a point on the ground,which is 30 m away from the foot of the tower is 45° .What is the height of the tower ?

2. Find the sun's altitude if the shadow of a 15 m high tower is $15\sqrt{3}$ m.

3. A circular piece of land is 40 m in diameter. A well of diameter 16 m has been dug to a depth of 28 m and the earth taken out has been spread evenly over the remaining area. How much has the level of ground been raised ?

4. From a point on the ground, 20 m away from the foot of vertical tower, the angle of elevation of the top of the tower is 60°. Find the height of the tower.

5. (a) In a right triangle ABC, right-angled at B, $BC = 6cm$ and $AB = 8cm$. A circle is inscribed in the $\triangle ABC$. Find the radius of the incircle.

   (b) Two cricles touch externally at P and AB is a common tangent, touching one circle at A and the other at B. Find the measure of $\angle APB$.

6. A solid sphere of radius r is melted and cast into the shape of a solid cone of height r. What is the radius of the base of the cone in terms of r ?

7. Answer any four of the following questions :

   (i) ABC and BDE are two equilateral triangles such that D is the mid-point of BC. The ratio of the areas of the triangles ABC and BDE is

(A) 2 : 1
(B) 1 : 2
(C) 4 : 1
(D) 1 : 4

(ii) In $\triangle ABC$, $AB = 4\sqrt{3}$ cm, $AC = 8cm$ and $BC = 4cm$. The angle B is

(A) 120°
(B) 90°
(C) 60°
(D) 45°

(iii) The perimeters of two similar triangles are $35cm$ and $21cm$ respectively. If one side of the first triangle is $9cm$,then the corresponding side of the second triangle is

(A) $5.4cm$
(B) $4.5cm$
(C) $5.6cm$
(D) $15cm$

(iv) In a $\triangle ABC, D$ and E are points on the sides AB and AC respectively such that $DE||BC$ and $AD : DB = 3 : 1$. If $AE = 3.3cm$,then AC is equal to

(A) $4cm$
(B) $1.1cm$
(C) $4.4cm$
(D) $5.5cm$

(v) In an isosceles triangle ABC, if $AC = BC$ and $AB^2 = 2AC^2$, then $\angle C$ is equal to

(A) 30°
(B) 45°
(C) 60°
(D) 90°

8. To explain how trignometry can be used measure the height of an inaccessible object, a teacher gave the following example to students :

A TV tower stands vertically n the bank of a canal. From a point on the other bank direct opposite the tower, the angle of the elevation of

the top of the tower is 60°.From another point 20 m away from this point to the foot of the tower, the angle of elevation of the top of the tower is 30° (as shown in Figure 1).

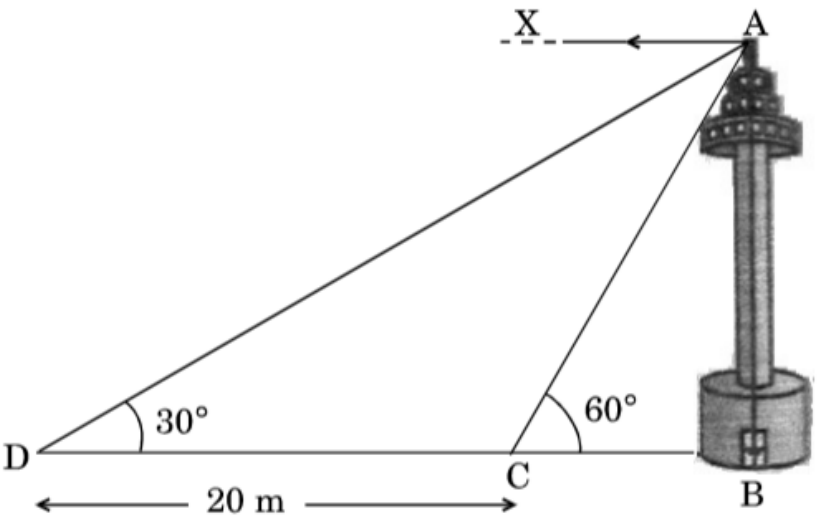

Figure 1: Projection of Tower

Based on the above, answer the following questions :

(i) The width of the canal is
   (A) $10\sqrt{3}m$
   (B) $20\sqrt{3}m$
   (C) $10m$
   (D) $20m$

(ii) Height of the tower is
   (A) $10\sqrt{3}m$
   (B) $10m$
   (C) $20\sqrt{3}m$
   (D) $20m$

(iii) Distance of the foot of the tower from the point D is
   (A) $20m$
   (B) $30m$
   (C) $10m$

(D) $20\sqrt{3}m$

(iv) The angle formed by the line of sight with the horizontal when it is above the horizontal line is known as

(A) angle of depression

(B) line of sight

(C) angle of elevation

(D) obtuse angle

(v) In above figure, measure of angle XAC is

(A) $30°$

(B) $60°$

(C) $90°$

(D) $45°$

9. A children's park is in the triangular shape as shown in the below figure.In the middle of the park, there is a circular region for younger children to play. It is fenced with three layers of wire. The radius of the circular region is $3m$. Based on the above,answer the following questions:

(i) The perimeter(or circumference) of the circular region is

(A) $3\pi m$

(B) $18\pi m$

(C) $6\pi m$

(D) $9\pi m$

(ii) The Total length of wire used is

(A) $9\pi m$

(B) $18\pi m$

(C) $54\pi m$

(D) $27\pi m$

(iii) The area of the circular region is

(A) $54\pi m^2$

(B) $3\pi m^2$

(C) $18\pi m^2$

(D) $9\pi m^2$

(iv) If $BD = 6m$, $DC = 9m$ and ar ($\triangle ABC = 54\ m^2$,then the length of sides AB and AC, respectively, are)

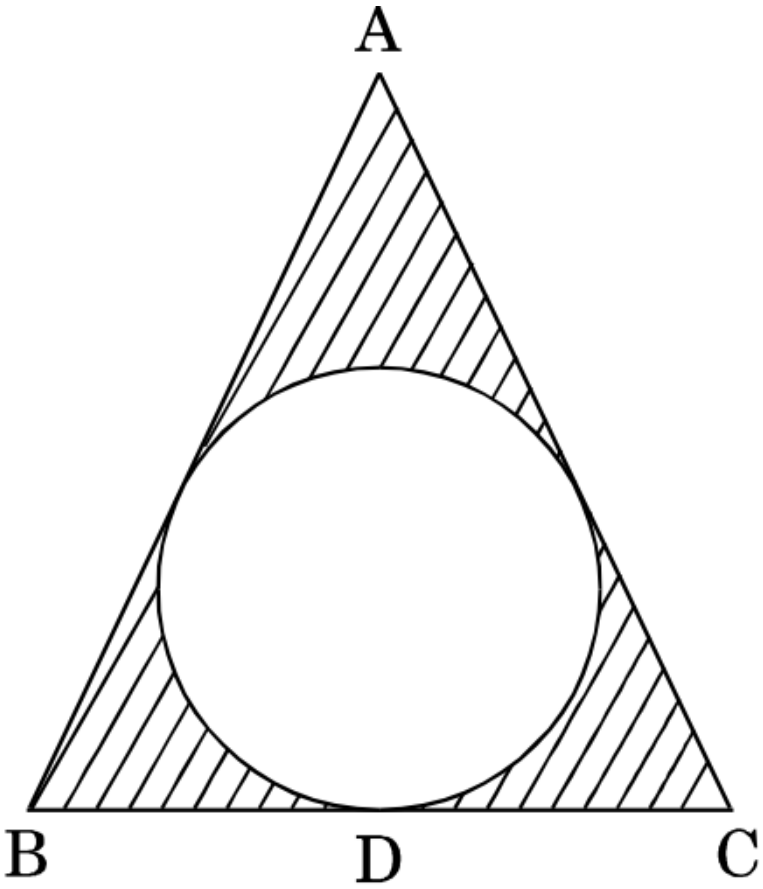

Figure 2: Children's Park in triangular shape

(A) $9m, 12m$
(B) $12m, 9m$
(C) $10m, 12m$
(D) $12m, 10m$

(v) The perimter of $\triangle ABC$ is

(A) $28m$
(B) $37m$
(C) $36m$
(D) $38m$