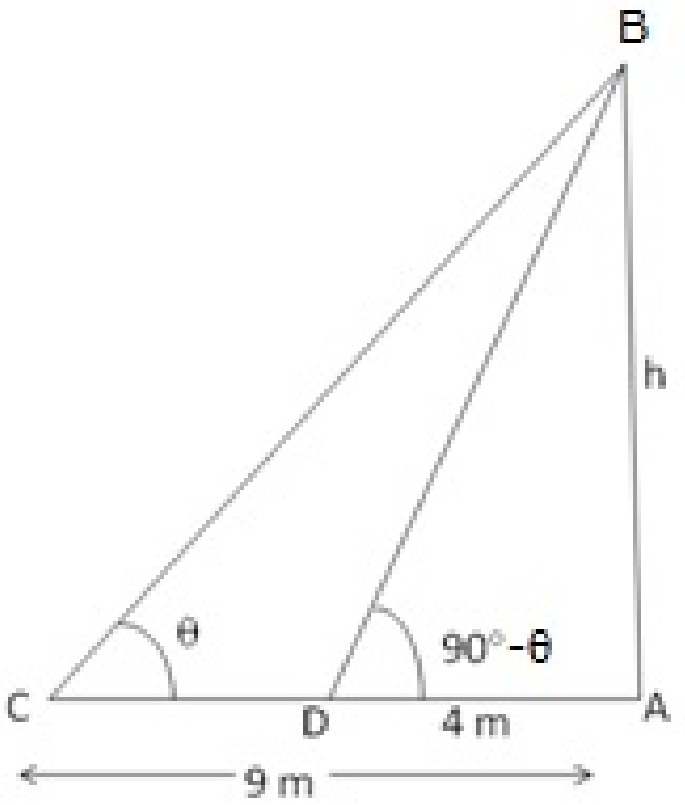
Question 23:
Let AB be the tower and let C and D be the two positions of the observer. Then, AC = 9 meters, and AD = 4 meters.
Let $\Delta ACB = \theta$



Then, $\angle ADB = (90° - \theta)$
Let AB = h meters
From right ΔCAB, we have

$$\frac{AB}{AC} = \tan\theta$$

$$\Rightarrow \frac{h}{9} = \tan\theta$$

$$\Rightarrow h = 9\tan\theta$$

From right ΔDAB, we have

$$\frac{AB}{AD} = \tan(90° - \theta) \Rightarrow \frac{h}{4} = \cot\theta$$

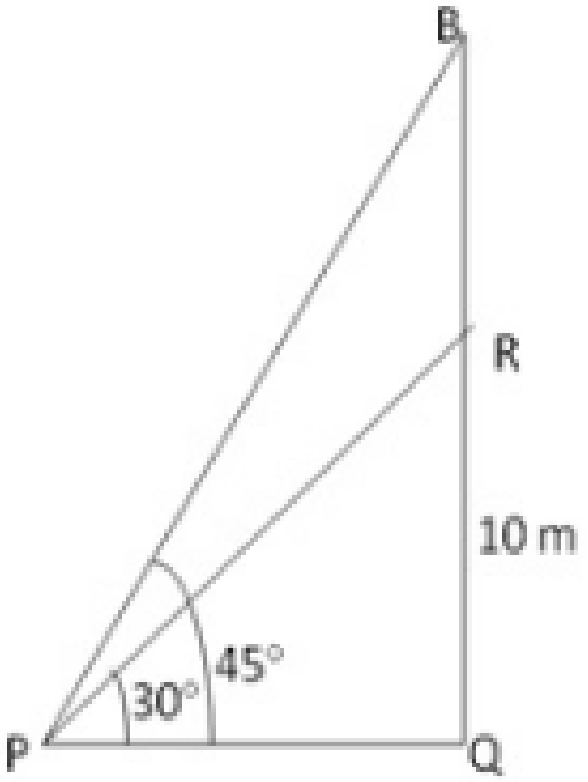
$$\Rightarrow \quad h = 4\cot\theta$$

from (1) & (2), we get

$$h^2 = 36 \Rightarrow h = 6$$

Hence, the height of tower is 6 meters.

Question 24:
Let P be the point of observation RQ is the building and BR is the flag staff of height h, $\angle BPQ = 45°$, $\angle RPQ = 30°$



$$\frac{PQ}{QR} = \cot 30^\circ = \sqrt{3}$$

$$\frac{PQ}{10} = \sqrt{3}$$

$$\Rightarrow PQ = 10\sqrt{3}\ m ----(1)$$

from right ΔPBQ, we have

$$\frac{PQ}{QB} = \frac{PQ}{10+h} = \cot 45^\circ = 1$$

$$PQ = 10+h ----(2)$$

From (1) and (2), we have

$$10 + h = 10\sqrt{3}$$

$$h = 10\sqrt{3} - 10$$

$$= (10 \times 1.73 - 10)\,\text{m}$$

$$= (17.3 - 10) = 7.3\,\text{m}$$

Hence distance of building is and length of the flags staff is 7.3 m

********** END **********