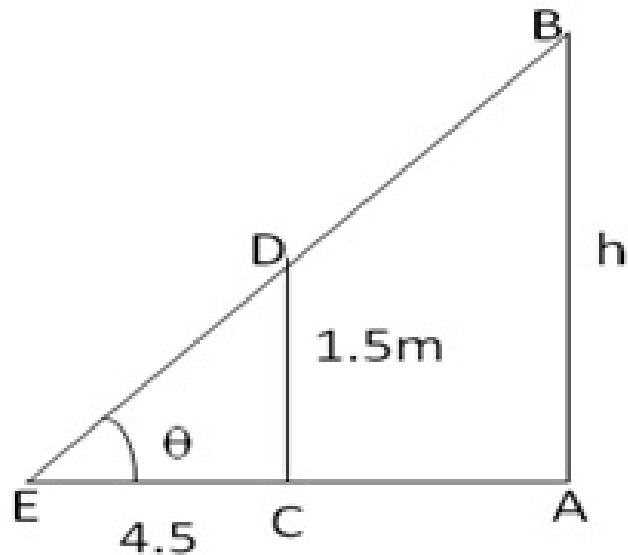




Question 5:

Let AB be the lamp post and CD be the boy, let CE be the shadow of CD

Let, $\angle AEB = \theta$



From right $\triangle ECD$, we get

$$\tan \theta = \frac{CD}{EC} = \frac{1.5}{4.5} = \frac{1}{3}$$

From right $\triangle EAB$, we get

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

$$\Rightarrow \frac{h}{(4.5 + 3)} = \frac{1}{3}$$

$$\Rightarrow 3h = 7.5$$

$$\Rightarrow h = 2.5\text{m}$$

Hence, the height of the lamp post = 2.5 m

Question 6:

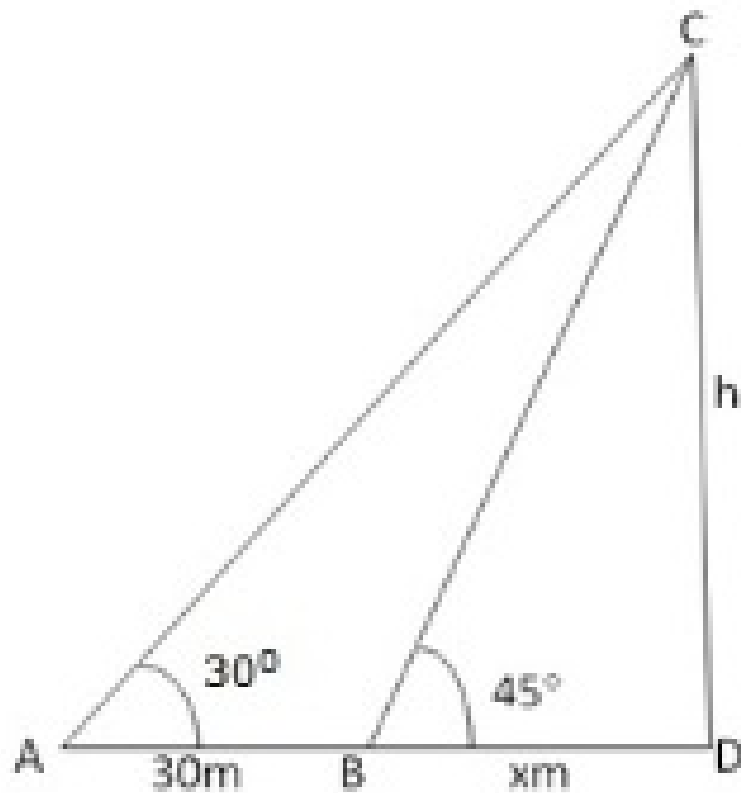
Let CD be the height of the building

Then, $\angle CAB = 30^\circ$, $\angle CBD = 45^\circ$,

$\angle ADC = 90^\circ$ and $AB = 30\text{m}$

$CD = h$ meters and $BD = x$ meters

From right $\triangle CAD$, we have



$$\frac{CD}{DA} = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$\frac{h}{30 + x} = \frac{1}{\sqrt{3}}$$

$$\Rightarrow 30 + x = h\sqrt{3}$$

$$x = (h\sqrt{3} - 30) \text{ ----- (1)}$$

From right $\triangle BCD$, we have

$$\frac{CD}{BD} = \tan 45^\circ$$

$$\Rightarrow \frac{h}{x} = 1$$

$$\Rightarrow h = x \text{ ---- (2)}$$

From (1) and (2), we get

$$h\sqrt{3} - 30 = h \Rightarrow h\sqrt{3} - h = 30$$

$$\Rightarrow h = \frac{30}{(\sqrt{3} - 1)} \times \frac{(\sqrt{3} + 1)}{(\sqrt{3} + 1)} = \frac{30\sqrt{3} + 30}{3 - 1} = \frac{30(\sqrt{3} + 1)}{2}$$

$$\Rightarrow h = 15(1.732 + 1) = 15 \times 2.732$$

$$\Rightarrow h = 40.98\text{m}$$

Putting $h = 40.98\text{m}$ in (2), we get $x = 40.98\text{ m}$
Hence, height of building = 40.98m and
Distance of its base from the point A
= $AB = (30+x)\text{ m}$
= $(30+40.98)\text{ m} = 70.98\text{ m}$

***** END *****