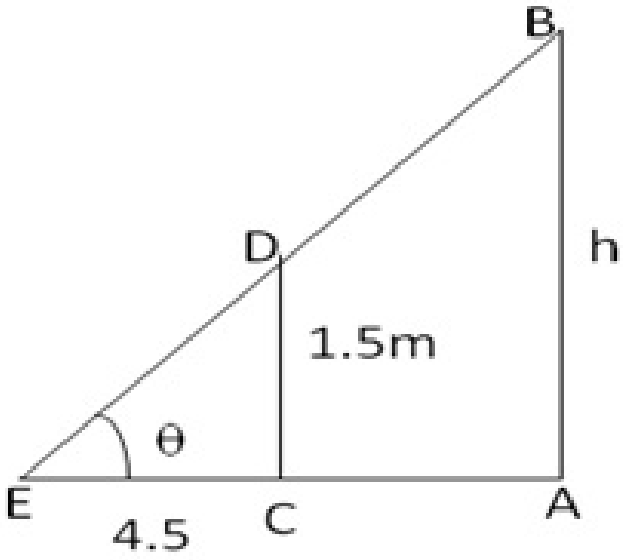
Question 5:
Let AB be the lamp post and CD be the boy, let CE be the shadow of CD
Let, ∠AEB = θ



From right Δ ECD, we get

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

From right Δ EAB, we get

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

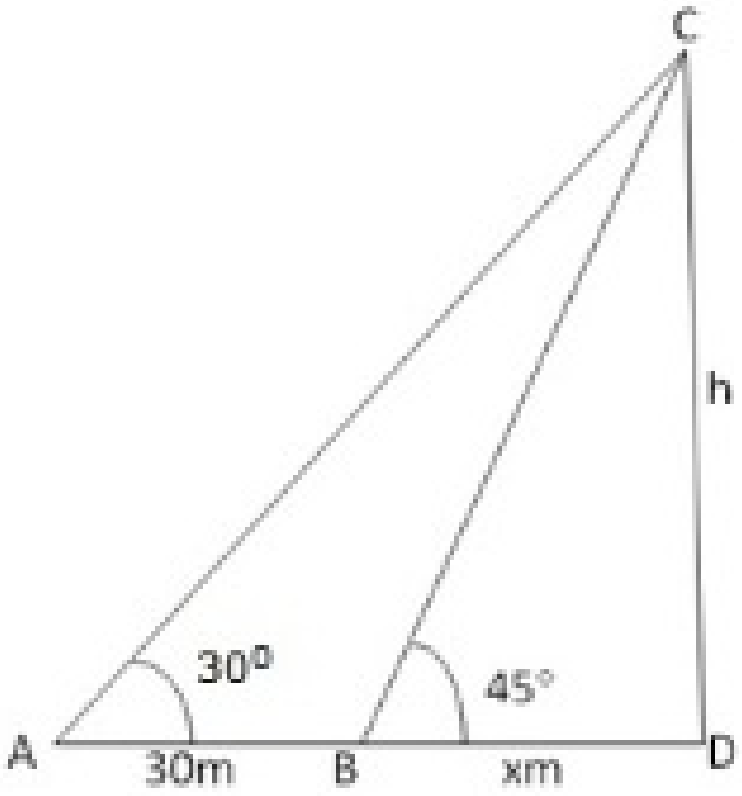
$$\Rightarrow \frac{h}{(4.5+3)} = \frac{1}{3}$$

$$\Rightarrow 3h = 7.5$$

$$\Rightarrow h = 2.5m$$

Hence, the height of the lamp post = 2.5 m

Question 6:
Let CD be the height of the building
Then, ∠CAB = 30°, ∠CBD = 45°,
∠ADC = 90° and AB = 30m
CD = h meters and BD = x meters
From right Δ CAD, we have



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

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

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

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

From right Δ BCD, we have

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

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

$$\Rightarrow h = x - - - (2)$$

From (1) and (2), we get

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

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

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

$$\Rightarrow h = 40.98m$$

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

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