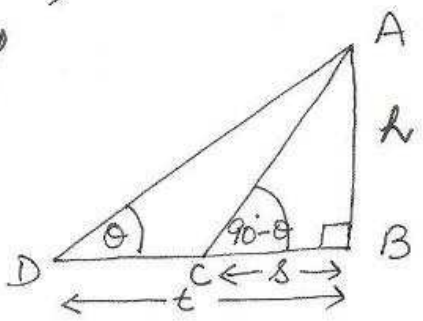
(6) let AB represents tower, C and D are points of observation




In rt $\triangle$ CBA

$$\tan(90^\circ-\theta) = \frac{h}{s}$$

$$\Rightarrow \cot\theta = \frac{h}{s} \quad \cdots (i)$$ $[\because \tan(90^\circ-\theta) = \cot\theta]$

In rt $\triangle$ DBA

$$\tan\theta = \frac{h}{t} \quad \cdots (ii)$$

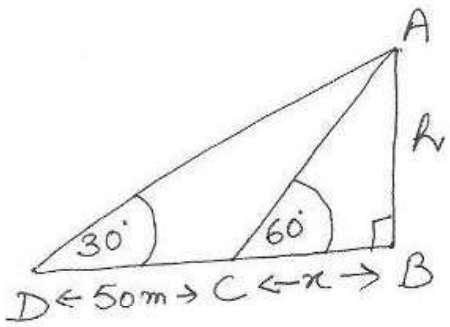
(i) $\times$ (ii)

$$\cot\theta \times \tan\theta = \frac{h}{s} \times \frac{h}{t}$$ $[\because \tan\theta = \frac{1}{\cot\theta}]$

$$1 = \frac{h^2}{st}$$

$$\Rightarrow h = \sqrt{st} \text{ units}$$

(7) let AB represents tower, C and D are endpoints of shadow




In rt $\triangle$ CBA

$$\tan 60^\circ = \frac{h}{x}$$

$$\sqrt{3}x = h \quad \cdots (i)$$

In rt $\triangle$ DBA

$$\tan 30^\circ = \frac{h}{x+50}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{x+50}$$

$$\Rightarrow h\sqrt{3} = x+50 \quad \cdots (ii)$$

Subs. value of h from (i) in (ii)

$$\sqrt{3} \times \sqrt{3}x = x+50$$

$$2x = 50$$

$$\Rightarrow x = 50$$

$$\therefore h = \sqrt{3} \times 50$$

$$= 50 \times 1.73$$

$$= 86.5 \text{ m}$$