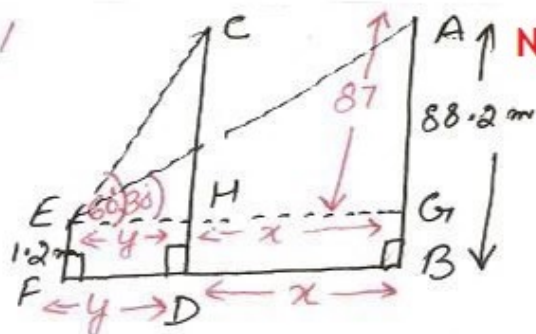


(14)



let A, C represent positions of balloon, EF represents the girl

In rt $\triangle EGA$

$$\tan 30^\circ = \frac{AG}{EG}$$

$$\frac{1}{\sqrt{3}} = \frac{87}{x+y}$$

$$x+y = 87\sqrt{3} \dots \textcircled{1}$$

In rt $\triangle EHC$

$$\tan 60^\circ = \frac{CH}{EH}$$

$$\sqrt{3} = \frac{87}{y}$$

$$\Rightarrow y = \frac{87}{\sqrt{3}} \dots \textcircled{ii}$$

$$\textcircled{1} - \textcircled{ii}$$

$$x+y-y = 87\sqrt{3} - \frac{87}{\sqrt{3}}$$

$$\Rightarrow x = \frac{87 \times 3 - 87}{\sqrt{3}}$$

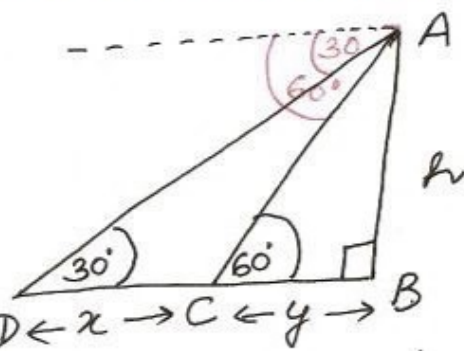
$$\Rightarrow x = \frac{87 \times 2}{\sqrt{3}}$$

$$\Rightarrow x = \frac{174}{\sqrt{3}} = 58\sqrt{3}$$

$$\Rightarrow x = 58\sqrt{3}$$

$$\therefore \text{distance trav.} = 58\sqrt{3} \text{m}$$

(15)



let AB represents tower, C, D are points of observation

In rt $\triangle CBA$

$$\tan 60^\circ = \frac{AB}{BC}$$

$$\sqrt{3} = \frac{h}{y}$$

$$\Rightarrow h = \sqrt{3}y \dots \textcircled{1}$$

In rt $\triangle DBA$

$$\tan 30^\circ = \frac{AB}{DB}$$

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

$$\Rightarrow x+y = h\sqrt{3} \text{ using } \textcircled{1}$$

$$x+y = \sqrt{3}x + \sqrt{3}$$

$$\Rightarrow x+y = 3x$$

$$\Rightarrow 2x = y$$

$$\Rightarrow x = \frac{y}{2}$$

time taken to cover x units = 68

time taken to cover x or $\frac{y}{2}$ units = $\frac{6}{\frac{2}{2}} = 38$