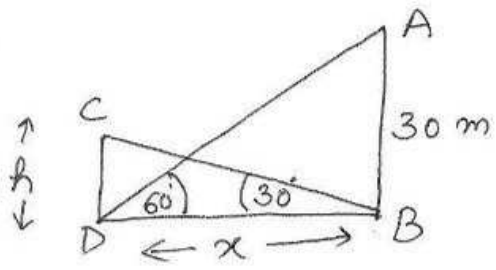
(13) let AB and CD represent towers



In rt $\triangle$ DBA

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

$$\sqrt{3} = \frac{30}{x}$$

$$\Rightarrow x = \frac{30}{\sqrt{3}}$$

$$= 10\sqrt{3}$$

In rt $\triangle$ BDC

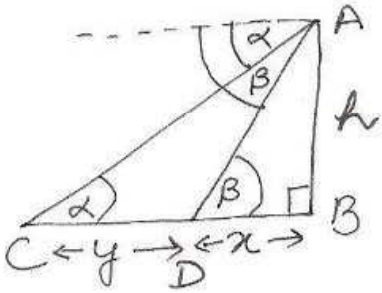
$$\tan 30^\circ = \frac{h}{x}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{10\sqrt{3}}$$

$$\Rightarrow h = 10$$

$\therefore$ distance between towers $= 10\sqrt{3}$
$= 17.3$ m

height of second tower $= 10$ m



In rt $\triangle$ DBA

$$\tan\beta = \frac{h}{x} \Rightarrow x = \frac{h}{\tan\beta} \quad \cdots (i)$$

In rt $\triangle$ CBA

$$\tan\alpha = \frac{h}{x+y} \Rightarrow x+y = \frac{h}{\tan\alpha}$$

$$\Rightarrow x = \frac{h}{\tan\alpha} - y \quad \cdots (ii)$$

From (i) and (ii)

$$\frac{h}{\tan\beta} = \frac{h}{\tan\alpha} - y$$

$$\Rightarrow y = h\left(\frac{1}{\tan\alpha} - \frac{1}{\tan\beta}\right)$$

$$\Rightarrow y = \frac{h(\tan\beta - \tan\alpha)}{\tan\alpha\tan\beta}$$

NCERT Exemplar Solutions by Dev Anoop (Bathinda) Ch. Appl. of Trigonometry Ex 8.4