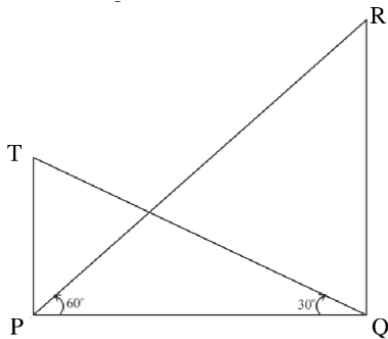# AI1110 - Assignment 1

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CS21BTECH11033

ICSE 2018 Grade 10

Q10-c: The angle of elevation from a point P of the top of a tower QR, 50m high is $60°$ and that of the tower PT from a point Q is $30°$. Find the height of tower PT, correct to the nearest metre.

Parameter	Symbol	Value
QR	h	50
Angle QPR	α	$60°$
Angle PQT	β	$30°$
Base PQ	d	???
PT	h_2	???

TABLE I

Solution: In ΔPQR, using basic trigonometric equation in a right-angled triangle, we know that,

$$\tan(\theta) = \frac{\text{perpendicular}}{\text{base}}$$

$$\Rightarrow \tan(\alpha) = \frac{h}{d}$$

$$\Rightarrow d = \frac{h}{\tan(\alpha)}$$

$$\Rightarrow d = \frac{50}{\tan(60°)}\,m$$

$$[\because \alpha = 60° \,\&\, h = 50m]$$

$$\Rightarrow d = \frac{50}{\sqrt{3}}\,m \quad - (1)$$

Now in ΔPQT, $\beta = 30°$.

$$\therefore \tan(\beta) = \frac{h_2}{d}$$

$$\Rightarrow h_2 = d \times \tan(\beta)$$

$$\Rightarrow h_2 = d \times \tan(30°)$$

$$\Rightarrow h_2 = \frac{50}{\sqrt{3}} \times \tan(30°)\,m$$

$$[using(1)]$$

$$\Rightarrow h_2 = \frac{50}{3}\,m$$

$\therefore h_2(PT) \approx \boxed{17}$ metres after rounding off.
This can be verified by plotting QR , α and β and approximating the length of PT.
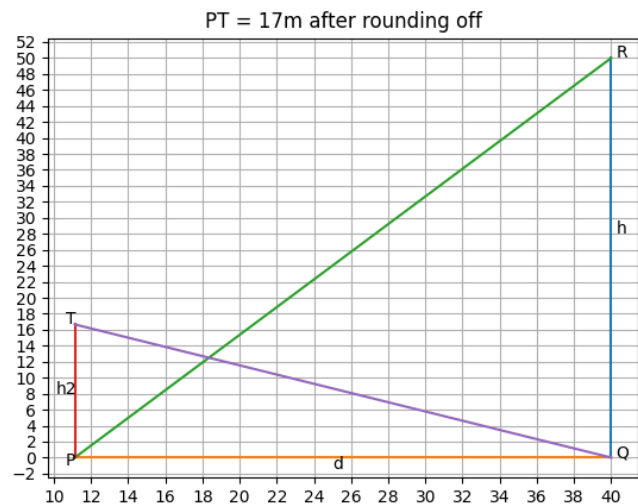**Output:** The Output of the program used to verify the answer is given below:

Fig. 0. Plot of the figure and calculated length