

given - In fig
 $OD \perp BC, OE \perp CA, OF \perp AB$

to prove

$$(i) OA^2 + OB^2 + OC^2 - OD^2 - OE^2 - OF^2 = AF^2 + BD^2 + CE^2$$

$$(ii) AF^2 + BD^2 + CE^2 = AE^2 + CD^2 + BF^2$$

Const - join OA, OB, OC

Proof - In rt ΔOFA

$$AF^2 = OA^2 - OF^2 \quad \text{(Py. th.)} \quad \dots \textcircled{i}$$

In rt ΔBDO

$$BD^2 = OB^2 - OD^2 \quad \text{(Py. th.)} \quad \dots \textcircled{ii}$$

In rt ΔOEC

$$CE^2 = OC^2 - OE^2 \quad \text{(Py. th.)} \quad \dots \textcircled{iii}$$

$$\textcircled{i} + \textcircled{ii} + \textcircled{iii}$$

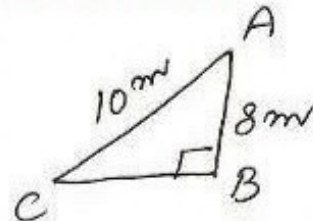
$$OA^2 + OB^2 + OC^2 - OD^2 - OE^2 - OF^2 = AF^2 + BD^2 + CE^2$$

$$\Rightarrow OA^2 - OE^2 + OB^2 - OF^2 + OC^2 - OD^2 = AF^2 + BD^2 + CE^2$$

$$\Rightarrow AE^2 + BF^2 + CD^2 = AF^2 + BD^2 + CE^2$$

[Using Pythagoras theorem in $\Delta AEO, \Delta BFO$ and ΔCDO]

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let AC rep. ladder, AB wall.

To find BC

Sol. In rt ΔCBA

$$AC^2 = AB^2 + BC^2 \quad \text{(Py. th.)}$$

$$10^2 = 8^2 + BC^2$$

$$\Rightarrow BC^2 = 100 - 64$$

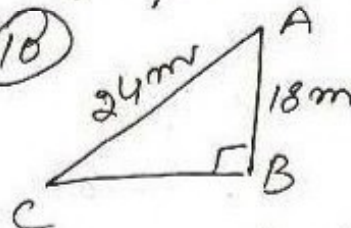
$$= 36$$

$$BC = \sqrt{36}$$

$$= 6$$

\therefore reqd. distance = 6m

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let AC rep. wire AB rep. pole

To find BC

Solution - In rt ΔCBA

$$BC^2 = AC^2 - AB^2 \quad \text{(Py. th.)}$$

$$= 24^2 - 18^2$$

$$= (24-18)(24+18)$$

$$= 6 \times 42$$

$$\Rightarrow BC = \sqrt{6 \times 42}$$

$$= \sqrt{6 \times 6 \times 7}$$

$$= 6\sqrt{7} \text{ m}$$

$$= 6 \times 2.645$$

$$\text{NCERT solutions by Dev Anoop (Bathinda)} = 15.87 \text{ m}$$