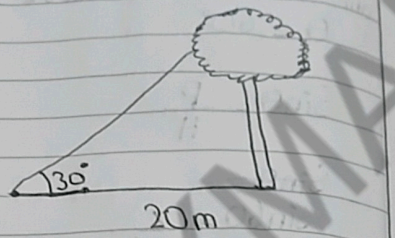
Unit 6 Ex 6.5

Q1



Height of tree = x = ?

$\theta = 30°$

d = 20m

$\tan\theta = \frac{P}{B}$

$\tan(30°) = \frac{x}{20}$

$(0.5773)(20) = x$

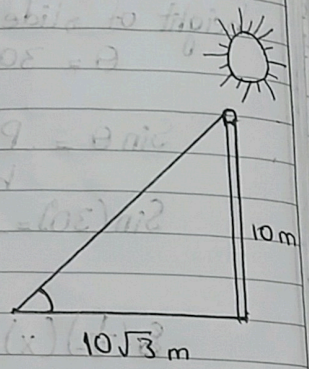
$11.546 = x$

$x = 11.55m$ Ans.

Q2 Height of pole = 10m

Length of shadow = $10\sqrt{3}$

θ = ?



$= \tan\theta = \frac{P}{B}$

$= \tan\theta = \frac{10}{10\sqrt{3}}$

$= \tan\theta = \frac{1}{\sqrt{3}}$

$= \theta = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

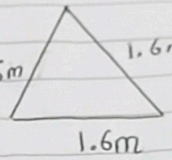
$\therefore \theta = 30°$

Q3

Height = ?

one side of window = 1.6m

$\theta = 60°$



In equilateral Δ all sides and all angles always equal.

So each angles is $= \frac{180}{3}$

$= 60°$

$\sin\theta = \frac{P}{H}$

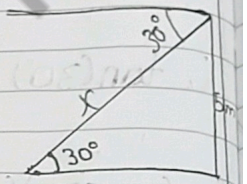
~~$\sin\theta =$~~

$\sin 60 = \frac{x}{1.6}$

$\left(\frac{\sqrt{3}}{2}\right)(1.6) = x$

$1.385 = x$

$x = 1.39$ Ans.



Q4 Length of slide = x

height of slide = 5m

$\theta = 30°$

$\sin\theta = \frac{P}{h}$

$\sin(30) = \frac{5}{x}$

$\left(\frac{1}{2}\right)(x) = 5$

$x = 5 \times 2$

$x = 10$ m

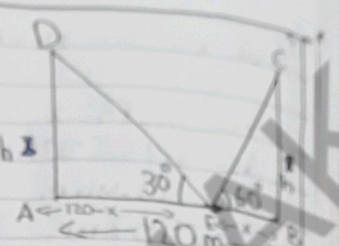
Q5 Width of road = 120m

In △ABDE

height of pole = h = ?

θ = 30°

Base AE = 120 − x



$\tan\theta = \frac{P}{B}$

$\tan(30^\circ) = \frac{h}{120-x}$

$(0.5773)(120-x) = h$

$69.276 - 0.5773x = h$

$69.28 - 0.5773x = h \longrightarrow (ii)$

In △BCE

$\tan\theta = \frac{P}{b}$

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

$(1.732)(x) = h$

$1.732x = h \longrightarrow (i)$

by comparing eq (i) and (ii)

$69.28 - 0.5773x = 1.732x$

$69.28 = 1.732x + 0.5773x$

$69.28 = 2.3093x$

$\frac{69.28}{2.3093} = x$

$x = 30m$

Postition of a point is 30m from one pole so.

120m − 30m = 90m

90m from second pole.

Put $x = 30$ in eq(ii)

$h = 1.732x$

$h = 1.732(30)$

$h = 51.96m$

$h = 52m$

Now Put $x = 30°$ In eq(i)

$h = 69.28 - 0.5773x$

$h = 69.28 - 0.5773(30)$

$h = 69.28 - 17.319$

$h = 51.96m$

$h = 52m$

Q6 height of pols = 120m

In ΔBCD

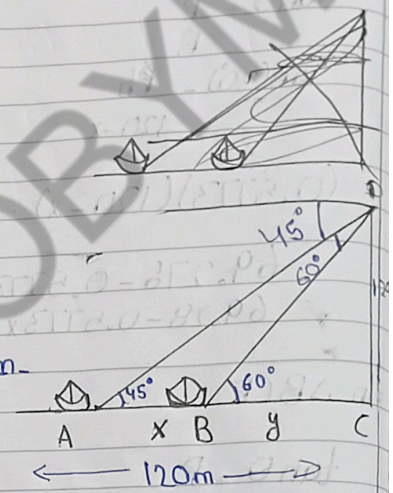
$\theta = 60°$

base = $BC = y = ?$

$\tan\theta = \frac{P}{B} = \frac{120}{y}$

$\tan 60° = \frac{120}{y}$

$y = \frac{120}{\tan 60°} = y = \frac{120}{1.732} = 69.28m$



Now ΔACD

$\theta = 45°$

$\tan\theta = \frac{P}{B} = \frac{120m}{AC}$

$\tan 45° = \frac{120}{AC}$

$1(AC) = 120$

$AC = 120m$

Now find Distance between both boats x.

$x = AC - y$

$x = 120 - 69.28m$

$x = 50.715$

$x = 50.72m$

Q7 In ΔABD

hieght of tree = 15m

$\theta = 30^\circ$

$AB = ?$

$\tan\theta = \frac{P}{B}$

$\tan 30^\circ = \frac{15}{x}$

$(0.5773)(x) = 15$

$x = \frac{15}{0.5773}$

$\boxed{x = 25.98m}$

Now In ΔBCD

hieght of tree = 15m

$\theta = 60^\circ$

$AC = ?$

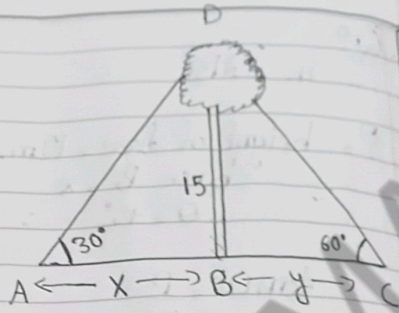
$\tan\theta = \frac{P}{B}$

$\tan 60^\circ = \frac{15}{y}$

$y = \frac{15}{\tan 60^\circ}$

$y = \frac{15}{(1.732)}$

$\boxed{y = 8.660m}$



Now find total distance.

$x + y$

$= 25.98m + 8.66m$

$= \boxed{34.64m}$ Ans.

Q8

In ΔABC

P = height of tree = 12m.

base B = x

$\theta = 45^\circ$

$\tan\theta = \frac{P}{B}$

$\tan(45^\circ) = \frac{12}{x}$

$x = \frac{12}{\tan(45^\circ)}$

$x = \frac{12}{1}$

$\boxed{x = 12m}$

Now BC = AE = 12

AB = EC = 12

In ΔECD

$\theta = 30^\circ$

EC = base = 12m

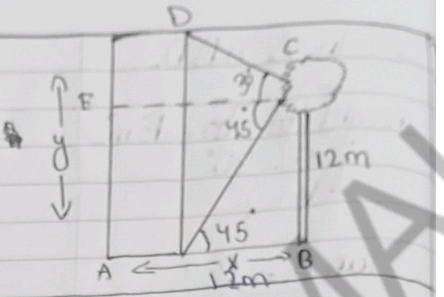
ED = h = ?

$\tan\theta = \frac{P}{B}$

$\tan 30^\circ = \frac{ED}{12}$

$(0.5774)(12) = ED$

$\boxed{6.93 = ED}$



Total height of building =

AE + ED

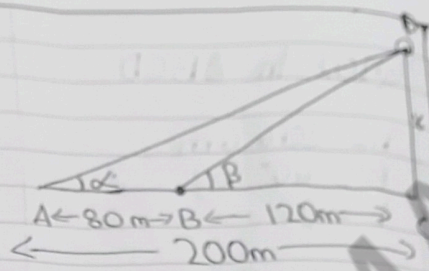
= 12 + 6.93

= $\boxed{18.93m}$

Q⁹ $\tan\alpha = \frac{2}{5}$

$\alpha = \tan^{-1}\left(\frac{2}{5}\right)$

$\alpha = 21.80$



In ΔACD

$\tan\alpha = \frac{P}{B}$

$\tan 21.80 = \frac{x}{200}$

$(0.3999)(200) = x$

$79.99 = x$

$80m = x$

In ΔBCD

$\beta = ?$

$h = 80m$

$b = 120m$

$\tan\beta = \frac{P}{B}$

$\tan\beta = \frac{80}{120}$

$\beta = \tan^{-1}\frac{80}{120}$

$\beta = 33.69°m$

(Q10) In ΔBCD

$h = 206.6\,m$

$\theta = 60^\circ$

$b = ?$

$\tan\theta = \frac{P}{B}$

$\tan(60^\circ) = \frac{206.6\,m}{b}$

$b = \frac{206.6}{\tan 60}$

$b = \frac{206.6}{(1.732)}$

$b = 119.28\,m$ or $BC = 119.28\,m$

In ΔACD

$h = 206.6\,m$

$\theta = 45^\circ$

$b = ?$

$\tan\theta = \frac{P}{B}$

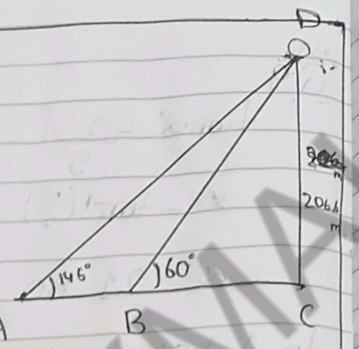
$\tan(45^\circ) = \frac{206.6\,m}{B}$

$B = \frac{206.6}{\tan(45^\circ)}$

$B = \frac{206.6}{1}$

$B = 206.6\,m$

$AC = 206.6\,m$



Now distance between AB

$AC - BC$

$= 206.6\,m - 119.28$

$= 87.32\,m$

Now find speed

$S = \frac{d}{t}$

$S = \frac{87.32}{120}$

Speed $= 0.727\,m/s$

Speed $= 0.73\,m/s$