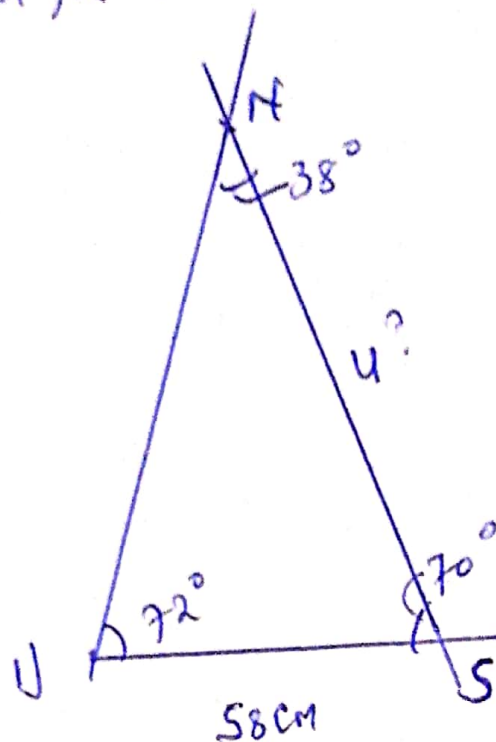


6. $\triangle SUN$
 $n = 58 \text{ cm}$, $\angle U = 72^\circ$ and $\angle N = 38^\circ$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

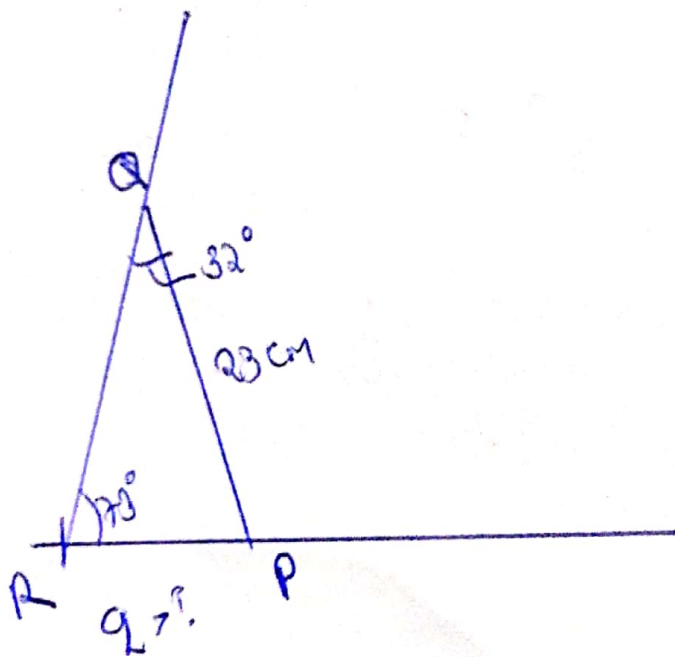
$$\frac{58}{\sin 38} = \frac{u}{\sin 72}$$

$$u = \frac{58 \sin 72}{\sin 38}$$

$$= 89.60 \text{ cm}$$

$$u \approx \underline{\underline{90 \text{ cm}}}$$

(b) $\triangle PQR$, $\angle R = 73^\circ$, $\angle Q = 32^\circ$ $r = 23 \text{ cm}$.



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

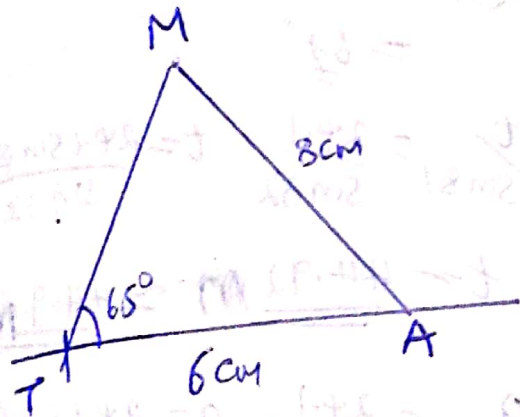
$$\frac{23}{\sin 73} = \frac{q}{\sin 32}$$

$$q = \frac{23 \sin 32}{\sin 73}$$

$$q = 12.75 \text{ cm}$$

$$q \approx \underline{\underline{13 \text{ cm}}}$$

(c) $\triangle TAM$, $t = 8 \text{ cm}$ $m = 6 \text{ cm}$ $\angle T = 65^\circ$
 $\angle M = ?$



$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

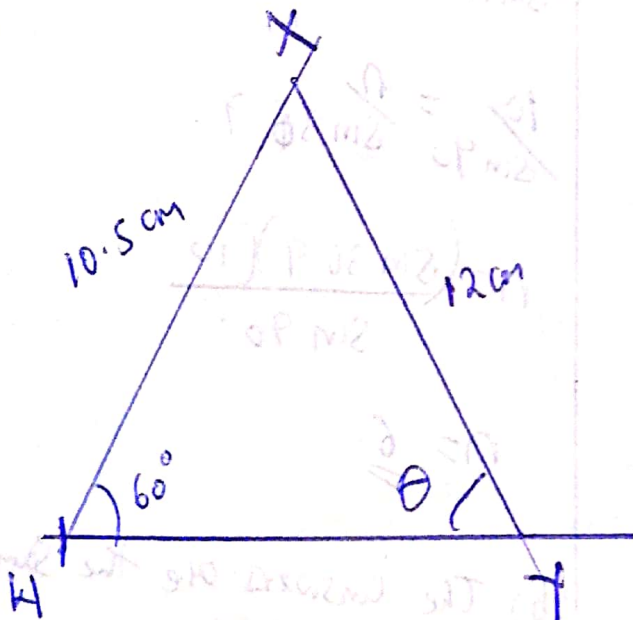
$$\frac{\sin 65}{8} = \frac{\sin M}{6}$$

$$\sin M = \frac{6 \sin 65}{8} = 0.6497$$

$$\angle M = 42.82^\circ$$

$$\angle M = \underline{\underline{43^\circ}}$$

0. $\triangle WXT$



$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 60}{12} = \frac{\sin \theta}{10.5}$$

$$\sin \theta = \frac{10.5 \sin 60}{12}$$

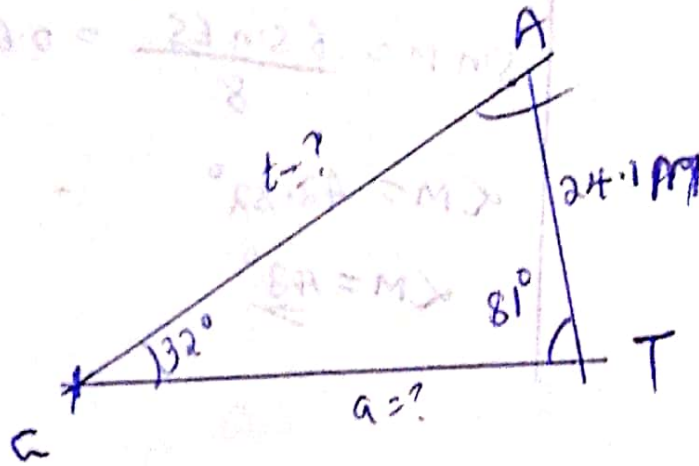
$$\sin \theta = 0.75777$$

$$\theta = 49.27^\circ$$

$$\angle T = 49.27^\circ$$

$$= \underline{\underline{49^\circ}}$$

7. $\triangle CAT$, $\angle C = 32^\circ$, $\angle T = 81^\circ$, $C = 24.1 \text{ cm}$



$$\angle A = 180 - (32 + 81) = 67^\circ$$

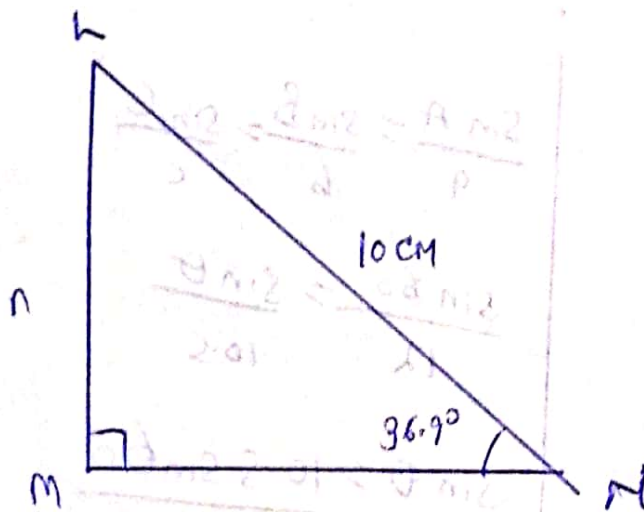
$$\frac{t}{\sin 81} = \frac{24.1}{\sin 32} \quad t = \frac{24.1 \sin 81}{\sin 32}$$

$$t = \underline{44.92 \text{ cm}} \approx \underline{44.9 \text{ cm}}$$

$$\frac{a}{\sin 67} = \frac{24.1}{\sin 32} \quad a = \frac{24.1 \sin 67}{\sin 32}$$

$$a = 41.86 \quad a \approx \underline{41.9 \text{ cm}}$$

8.



$$(a) \sin 36.9^\circ = \frac{n}{10 \text{ cm}}$$

$$n = 10 \text{ cm} \sin 36.9^\circ$$

$$n = \underline{6}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

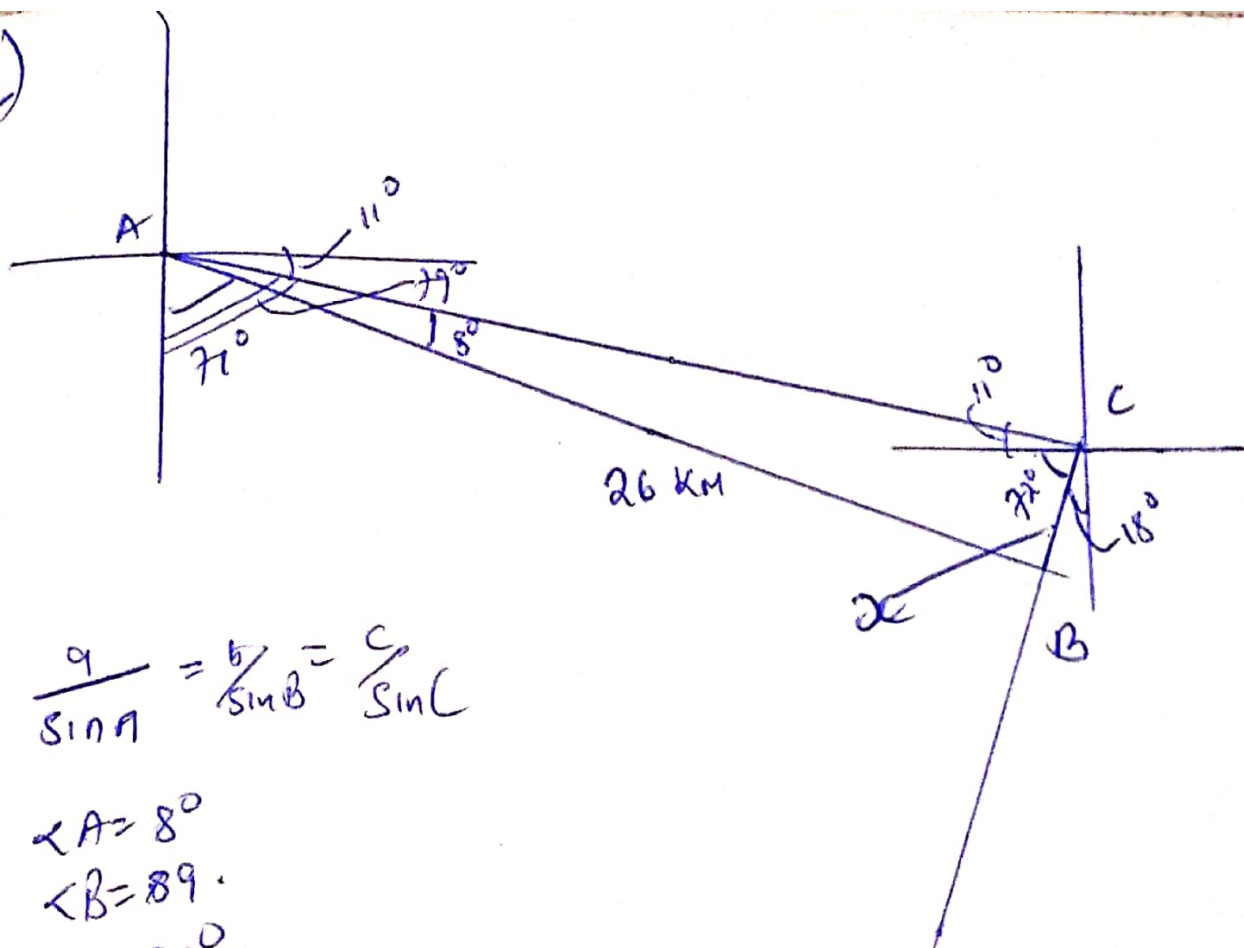
$$\frac{10}{\sin 90} = \frac{n}{\sin 36.9}$$

$$n = \frac{(\sin 36.9)(10)}{\sin 90}$$

$$n = \underline{6}$$

(b) The answers are the same
Since the value of the denominator of the second method ($\sin 90^\circ$) = 1

(9)



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\angle A = 8^\circ$$

$$\angle B = 89^\circ$$

$$\angle C = 83^\circ$$

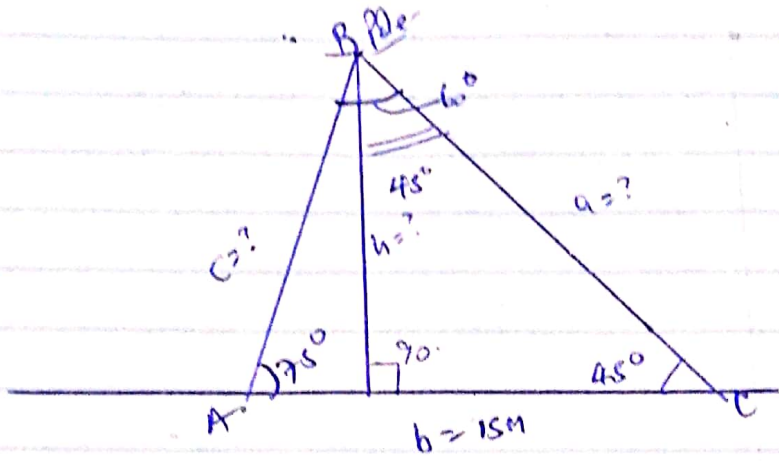
$$\frac{26}{\sin 83^\circ} = \frac{x}{\sin 8^\circ}$$

$$x = \frac{26 \sin 8^\circ}{\sin 83^\circ}$$

$$x = 3.65 \text{ km}$$

$$x = \underline{\underline{3.7 \text{ km}}}$$

do



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{15}{\sin 60} = \frac{c}{\sin 45} \Rightarrow c = \frac{15 \sin 45}{\sin 60}$$

$$c = 12.25 \text{ m}$$

$$c \approx \underline{\underline{12.2 \text{ m}}}$$

$$\frac{15}{\sin 60} = \frac{a}{\sin 75}$$

$$a = \frac{15 \sin 75}{\sin 60}$$

$$a = 16.73$$

$$a \approx \underline{\underline{16.7 \text{ m}}}$$

height of the pole.

$$\frac{16.7}{\sin 90} = \frac{h}{\sin 45}$$

$$h = \frac{16.7 \sin 45}{\sin 90} = 11.8 \text{ m}$$

$$\text{height of pole} = \underline{\underline{11.8 \text{ m}}}$$

Practising:

(a) $\angle D = 53^\circ$ $F = ?$
 $\angle G = 68^\circ$ $d = ?$
 $f = 22.5$
 $\angle F = 180 - (53 + 68)$
 $= 180 - 121 = \underline{\underline{59^\circ}}$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{22.5}{\sin 59} = \frac{d}{\sin 53}$$

$$22.5 \sin 53^\circ = (\sin 59^\circ) d$$

$$d = \frac{22.5 \sin 53^\circ}{\sin 59^\circ}$$

$$= \underline{\underline{20.96 \text{ cm.}}}$$

(b) $\angle A = 40^\circ$ $b = ?$
 $\angle B = 60^\circ$ $a = ?$
 $\angle C = ?$
 $c = 40.0 \text{ cm}$
 $\angle C = 180 - (40 + 60)$
 $= 80^\circ$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{40}{\sin 80} = \frac{b}{\sin 60}$$

$$b = \frac{40 \sin 60}{\sin 80}$$

$$b = \underline{\underline{35.18 \text{ cm.}}}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{\sin 40} = \frac{40}{\sin 80}$$

$$a = \frac{40 \sin 40^\circ}{\sin 80^\circ}$$

$$a = \underline{\underline{26.11 \text{ cm.}}}$$

(c) $\angle X = 88^\circ$ $y = ?$
 $\angle Z = 25^\circ$
 $\angle Y = ?$
 $z = 3 \text{ cm}$
 $\angle Y = 180 - (88 + 25)$
 $\angle Y = \underline{\underline{67^\circ}}$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{y}{\sin 67} = \frac{3}{\sin 25}$$

$$y = \frac{3 \sin 67^\circ}{\sin 25^\circ}$$

$$y = \underline{\underline{6.53 \text{ cm.}}}$$

$$d.k = 29^\circ$$

$$\theta = ?$$

$$n = 45.2 \text{ cm}$$

$$l = 24.4 \text{ cm}$$

$$\Rightarrow \frac{\sin A}{a} = \frac{\sin B}{b} \Rightarrow \frac{\sin C}{c}$$

$$\frac{\sin 29^\circ}{24.4} = \frac{\sin \theta}{45.2}$$

$$\theta = \underline{63.91^\circ}$$

$$\sin \theta = \frac{45.2 \sin 29^\circ}{24.4}$$

$$\sin \theta = 0.89808$$

$$(e) S = 6.5 \text{ cm}$$

$$\angle Q = 50^\circ$$

$$Q = 5.0 \text{ cm}$$

$$\alpha = ?$$

$$\theta = ?$$

$$\frac{\sin 50^\circ}{S} = \frac{\sin \alpha}{6.5}$$

$$\sin \alpha = \frac{6.5 \sin 50^\circ}{S}$$

$$\sin \alpha = 0.9959$$

$$\alpha = \underline{84.78^\circ}$$

$$\frac{\sin 50^\circ}{S} = \frac{\sin \theta}{5}$$

$$\theta = 180 - (50 + 84.78)$$

$$\alpha = 180^\circ - 134.78^\circ$$

$$\alpha = \underline{45.22^\circ}$$

$$(f) \angle K = 80^\circ$$

$$K = 6.7 \text{ m}$$

$$\angle L = \theta$$

$$l = 2.9 \text{ m}$$

$$\angle J = \alpha$$

$$J = ?$$

$$\frac{\sin 80^\circ}{6.7 \text{ m}} = \frac{\sin \theta}{2.9 \text{ m}}$$

$$\sin \theta = \frac{2.9 \sin 80^\circ}{6.7 \text{ m}}$$

$$\sin \theta = 0.4262$$

$$\theta = \underline{25.23^\circ}$$

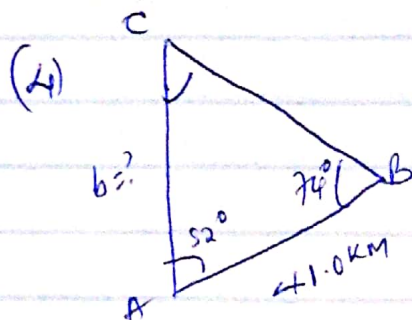
$$\alpha = 180 - (80 + 25.23)$$

$$= \underline{74.77^\circ}$$

$$\frac{6.7}{\sin 80^\circ} = \frac{J}{\sin 74.77^\circ}$$

$$J = \frac{6.7 \sin 74.77^\circ}{\sin 80^\circ}$$

$$J = \underline{6.56 \text{ m}}$$



$$\angle C = 180 - (52 + 74)$$

$$= \underline{54^\circ}$$

$$b = ? = \frac{41 \sin 74^\circ}{\sin 54^\circ} = \frac{c}{\sin 54^\circ} = \frac{c}{\sin C}$$

$$\frac{41}{\sin 54^\circ} = \frac{b}{\sin 74^\circ}$$

$$b = \frac{41 \sin 74^\circ}{\sin 54^\circ}$$

$$= \underline{48.7 \text{ km}}$$

Part A. Since $\angle B$ is the largest angle, and we are given the measurement for $c = 41 \text{ km}$. Then for b , 36 km is an underestimate.

Check understanding-

a. $\angle B = 72^\circ$
 $b = ?$

$c = 27.2 \text{ cm}$

$\angle C = 43^\circ$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{27.2}{\sin 43^\circ} = \frac{b}{\sin 72^\circ}$$

$$b = \frac{27.2 \sin 72^\circ}{\sin 43^\circ}$$

$$b = \underline{37.9 \text{ cm}}$$

b. $\angle B = 44^\circ$

$b = 29.5 \text{ cm}$

$\angle C = \theta$

$c = 37.1 \text{ cm}$

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 44^\circ}{29.5} = \frac{\sin \theta}{37.1 \text{ cm}}$$

$$\sin \theta = \frac{37.1 \text{ cm} \sin 44^\circ}{29.5}$$

$$\sin \theta = 0.8786$$

$$\theta = 60.88$$

$$\theta \approx \underline{\underline{61^\circ}}$$