

$$(ii) \cos 74^\circ 39'$$

$$= \cos 74^\circ 36' = 0.2656 \text{ [by trigonometric table]}$$

~~mean difference for~~

$$\cos 74^\circ 36' = 0.2656$$

$$\text{mean difference for } 3' = 8 \text{ (to be subtracted for cosine)}$$

$$\cos 74^\circ 39' = 0.2648$$

$$(iii) \tan 54^\circ 26'$$

$$\Rightarrow \tan 54^\circ 24' = 1.3968 \text{ (by trigonometric table)}$$

$$\text{mean difference for } 2' = 17 \text{ (to be added for tangent)}$$

$$\tan 54^\circ 26' = 1.3985$$

$$(iv) \sin 21^\circ 21'$$

$$\Rightarrow \sin 21^\circ 18' = 0.3633 \text{ (by trigonometric table)}$$

$$\text{mean difference for } 3' = 8 \text{ (to be added for sine)}$$

$$\sin 21^\circ 21' = 0.3641$$

$$(v) \cos 33^\circ 53'$$

$$\Rightarrow \cos 33^\circ 48' = 0.8310 \text{ [by trigonometric table]}$$

$$\text{mean difference for } 3' = 8 \text{ (to be subtracted for cosine)}$$

$$\cos 33^\circ 53' = 0.8302$$

$$(v) \tan 70^\circ 17'$$

$$\Rightarrow \tan 70^\circ 12' = 2.7776 \quad \left[\begin{array}{l} \text{by trigonometric} \\ \text{table} \end{array} \right]$$
$$\text{mean difference for } 5' = 1.31 \quad \left[\begin{array}{l} \text{to be added for} \\ \text{tan} \end{array} \right]$$

$$\tan 70^\circ 17' = 2.7907$$

(2) Find the value of θ if

(i) $\sin \theta = 0.9975$ (ii) $\cos \theta = 0.6763$

(iii) $\tan \theta = 0.0720$ (iv) $\cos \theta = 0.0410$

(v) $\tan \theta = 7.5958$.

$$\Rightarrow (i) \sin \theta = 0.9975$$

$$\sin \theta = 0.9974 + 0.0001$$

$$\sin \theta = \sin 85^\circ 54' + (3' \text{ or } 4' \text{ or } 5') \quad \left[\begin{array}{l} \text{by trigonometric} \\ \text{table} \end{array} \right]$$

$$\therefore \sin \theta = \sin 85^\circ 54' + 3'$$

$$\sin \theta = \sin 85^\circ 57'$$

$$\theta = 85^\circ 57'$$

$\left[\begin{array}{l} \text{we know that} \\ \text{mean difference for} \\ 3' \text{ or } 4' \text{ or } 5' = 1 \end{array} \right]$

$$\therefore \sin \theta = \sin 85^\circ 54' + 4' \quad \left| \quad \therefore \sin \theta = \sin 85^\circ 54' + 5' \right.$$

$$\sin \theta = \sin 85^\circ 58'$$

$$\theta = 85^\circ 58'$$

$$\sin \theta = \sin 85^\circ 59'$$

$$\theta = 85^\circ 59'$$

Therefore $\theta = 85^\circ 57'$ or $85^\circ 58'$ or $85^\circ 59'$

(ii) $\cos \theta = 0.6763$

$$\cos \theta = 0.6769 - 0.0006$$

$$\cos \theta = \cos 47^\circ 24' + 3' \quad \left[\begin{array}{l} \text{by trigonometric table} \\ \text{mean difference for} \\ 3' = 6 \end{array} \right]$$

$$\cos \theta = \cos 47^{\circ} 27'$$

$$\theta = 47^{\circ} 27'$$

$$(ii) \tan \theta = 0.0720$$

$$\tan \theta = 0.0717 + 0.0003$$

$$\tan \theta = \tan 4^{\circ} 6' + 1'$$

$$\tan \theta = \tan 4^{\circ} 7'$$

$$\theta = 4^{\circ} 7'$$

by trigonometric table
mean difference for $1' = 3$

$$(iv) \cos \theta = 0.0410$$

$$\cos \theta = 0.0419 - 0.0009$$

$$\cos \theta = \cos 87^{\circ} 36' + 3'$$

$$\cos \theta = \cos 87^{\circ} 39'$$

$$\theta = 87^{\circ} 39'$$

by trigonometric table
mean difference for
 $3' = 9$

$$(v) \tan \theta = 7.5958$$

$$\tan \theta = 7.5958$$

$$\tan \theta = \tan 82^{\circ} 30'$$

$$\tan \theta = \tan 82^{\circ} 30'$$

$$\theta = 82^{\circ} 30'$$

by trigonometric table

③ Find the value of the following:

(i) $\sin 65^\circ 39' + \cos 24^\circ 57' + \tan 10^\circ 10'$

(ii) $\tan 70^\circ 58' + \cos 15^\circ 26' - \sin 84^\circ 59'$

④ $\sin 65^\circ 39'$

$\sin 65^\circ 36' = 0.9107$

mean difference for $3'$ = 4 [to be added for Sines]

$\sin 65^\circ 39' = 0.9111$

$\cos 24^\circ 57'$

$\cos 24^\circ 54' = 0.9070$

mean difference for $3'$ = 4 [to be subtracted for cosines]

$\cos 24^\circ 57' = 0.9066$

$\tan 10^\circ 10'$

$\tan 10^\circ 6' = 0.1781$

mean difference for $4'$ = 12 [to be added for tan]

$\tan 10^\circ 10' = 0.1793$

Now, $\sin 65^\circ 39' + \cos 24^\circ 57' + \tan 10^\circ 10'$

$= 0.9111 + 0.9066 + 0.1793$

~~$= 1.9966$~~

$= 1.9970$

$$(u) \tan 70^{\circ} 58'$$

$$\tan 70^{\circ} 54' = \begin{array}{r} 2.8878 \\ \cancel{2.8878} \end{array}$$

$$\text{mean difference for } 4' = 104 \text{ (to be added for tan)}$$

$$\tan 70^{\circ} 58' = \begin{array}{r} \cancel{2.8878} \\ 2.8982 \end{array}$$

$$\cos 15^{\circ} 26'$$

$$\cos 15^{\circ} 24' = 0.9641$$

$$\text{mean difference for } 2' = 2 \text{ (to be subtracted for cosines)}$$

$$\cos 15^{\circ} 26' = 0.9639$$

$$\sin 84^{\circ} 59'$$

$$\sin 84^{\circ} 54' = 0.9960$$

$$\text{mean difference for } 5' = 2 \text{ (to be added for sines)}$$

$$\sin 84^{\circ} 59' = 0.9962$$

$$\text{now, } \tan 70^{\circ} 58' + \cos 15^{\circ} 26' - \sin 84^{\circ} 59'$$

$$= 2.8982 + 0.9639 - 0.9962$$

$$= 3.8621 - 0.9962$$

$$= 2.8659$$

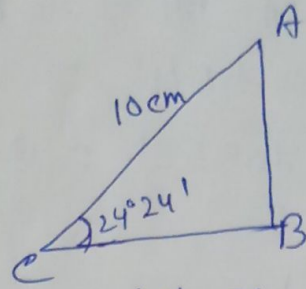
Therefore,

$$\tan 70^{\circ} 58' + \cos 15^{\circ} 26' - \sin 84^{\circ} 59' = 2.8659.$$

- ④ Find the area of a right triangle whose hypotenuse is 10 cm and one of the acute angle is $24^{\circ}24'$



$$AC = 10 \text{ cm (given)}$$



Now, $\triangle ABC$, is a right angle triangle.

then,

$$\sin 24^{\circ}24' = \frac{AB}{AC}$$

$$0.4131 = \frac{AB}{10} \quad \left[\begin{array}{l} \text{by trigonometric table} \\ \sin 24^{\circ}24' = 0.4131 \end{array} \right]$$

$$AB = 4.131 \text{ cm}$$

~~Now~~ Now, $\triangle ABC$,

$$\text{then, } \cos 24^{\circ}24' = \frac{BC}{AC}$$

$$0.9107 = \frac{BC}{10} \quad \left[\begin{array}{l} \text{by trigonometric table} \\ \cos 24^{\circ}24' = 0.9107 \end{array} \right]$$

$$BC = 9.107 \text{ cm.}$$

$$\text{Area of } \triangle ABC = \frac{1}{2} \times AB \times BC$$

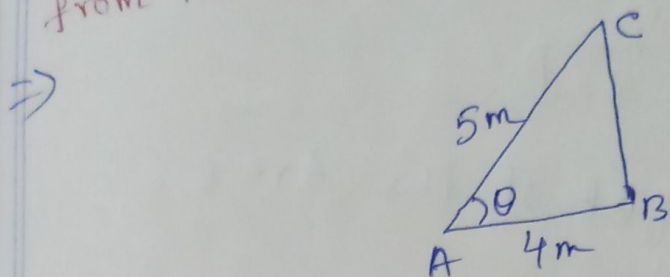
$$= \frac{1}{2} \times 4.131 \times 9.107 \text{ cm}^2$$

$$= \frac{37.62}{2} \text{ cm}^2$$

$$= 18.81 \text{ cm}^2$$

Therefore the area of right triangle is 18.81 cm^2 .

- 5) Find the angle made by a ladder of length 5m with the ground, if one of its end is 4m away from the wall and the other end is on the wall.



now, $\triangle ABC$ is a right-angle triangle.

$AC =$ length of the ladder $= 5m$.

$AB = 4m$

Let the angle made ~~by~~ by θ .

now, $\triangle ABC$,

$$\cos \theta = \frac{AB}{AC}$$

$$\cos \theta = \frac{4}{5}$$

$$\cos \theta = 0.8$$

$$\cos \theta = \cos 36^\circ 52'$$

$$\theta = 36^\circ 52'$$

[by trigonometric table]
 $\cos 36^\circ 52' = 0.8000$

Thus, the angle made by a ladder with the ground is ~~36.52~~ $\theta = 36^\circ 52'$.

- 6) In the given figure, HT shows the height of a tree standing vertically. From a point P, the angle of elevation of the top of the tree (that is $\angle P$) measures 42° and the distance to the tree is 60 metres. Find the height of the tree.