Samdhra &

9th 8th advanced ws-1

8th foundation

1 Task

(1)

(1) Given $\sin\theta = \frac{1}{2}$

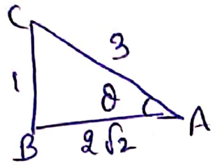
i.e, we know that $\sin 30° = \frac{1}{2}$

$\therefore \theta = 30°$

$\Rightarrow \operatorname{cosec}\theta = \operatorname{cosec} 30° = 2$

(2) Given $\sin\theta = \frac{1}{3}$

From



Acc to Pythagorous theorem

$AC^2 = AB^2 + BC^2$

$\Rightarrow 3^2 = AB^2 + 1$

$\Rightarrow 9 = AB^2 + 1 \Rightarrow AB^2 = 9 - 1 = 8$

$\Rightarrow AB = \sqrt{8}$ (or) $2\sqrt{2}$

$\therefore \tan\theta = \frac{\text{opp side}}{\text{adj side}}$

$= \frac{BC}{AB} \Rightarrow \tan\theta = \frac{1}{2\sqrt{2}}$

(4) Given $\sec\theta = \frac{2}{\sqrt{3}}$

$\sin 30° = \frac{1}{2}$; $\cos 30° = \frac{\sqrt{3}}{2}$

we know that $\sec 30° = \frac{2}{\sqrt{3}}$; $\tan 30° = \frac{1}{\sqrt{3}}$; $\cot 30° = \sqrt{3}$

$\Rightarrow \theta = 30°$

(6) Given $5\tan^2 A - 5\sec^2 A + 1 = ?$

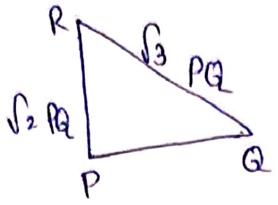
we know that $\sec^2 A - \tan^2 A = 1$

$\therefore$ From the given equation $5\tan^2 A - 5\sec^2 A + 1$

$\Rightarrow 5(\tan^2 A - \sec^2 A) + 1$

$\Rightarrow 5(-1) + 1 = -5 + 1 = -4.$

(5)



From Pythagorean theorem

$$QR^2 = PQ^2 + PR^2$$

$$\Rightarrow (\sqrt{3}\,PQ)^2 = PQ^2 + PR^2$$

$$\Rightarrow 3PQ^2 = PQ^2 + PR^2$$

$$\Rightarrow 3PQ^2 - PQ^2 = PR^2$$

$$\Rightarrow PR^2 = 2PQ^2$$

$$\Rightarrow PR = \sqrt{2}\,PQ$$

(a)

$\therefore$

$$\sin Q = \frac{\text{opp side}}{\text{hyp}} = \frac{PR}{RQ}$$

$$\sin \theta = \frac{\sqrt{2}\,PQ}{\sqrt{3}\,PQ} = \sqrt{\frac{2}{3}}$$

$$\operatorname{cosec} Q = \frac{1}{\sin Q}$$

$$\Rightarrow \operatorname{cosec} Q = \frac{1}{\sqrt{\frac{2}{3}}} = \sqrt{\frac{3}{2}}$$

$$\cos Q = \frac{\text{adj side}}{\text{hyp}} = \frac{PQ}{RQ}$$

$$\Rightarrow \cos Q = \frac{PQ}{\sqrt{3}\,PQ} = \frac{1}{\sqrt{3}}$$

and

$$\cot Q = \frac{\text{adj side}}{\text{opp side}} = \frac{PQ}{PR}$$

$$\cot Q = \frac{PQ}{\sqrt{2}\,PQ} = \frac{1}{\sqrt{2}}.$$

(7)

Given $\cos(\alpha+\beta) = 0$

we know $\cos 90^\circ = 0$

$\therefore$ $\alpha + \beta = 90^\circ$

$\Rightarrow \alpha = 90^\circ - \beta$

$\therefore \sin(\alpha - \beta) = \sin(90 - \beta - \beta)$

$= \sin(90 - 2\beta)$

$\Rightarrow \cos 2\beta$

(8) Given $\cos\theta - \sin\theta = 0$

$\Rightarrow \cos\theta = \sin\theta$

$\Rightarrow \dfrac{\cos\theta}{\sin\theta} = 1$

$\Rightarrow \cot\theta = 1$

$\Rightarrow \theta = 45^\circ$

Now we have to find

$(\sin^4\theta + \cos^4\theta) = ?$

$\Rightarrow (\sin 45^\circ)^4 + (\cos 45^\circ)^4$

$\Rightarrow \left[\left(\frac{1}{\sqrt{2}}\right)^4 + \left(\frac{1}{\sqrt{2}}\right)^4\right]$

$\Rightarrow \frac{1}{4} + \frac{1}{4} = \frac{1+1}{4} = \frac{2}{4} = \frac{1}{2}$

LTask

②

$PQ^2 + PR^2$

QR^2

⑨ Given $\sin x + \sin^2 x = 1$.

From here $\sin x = 1 - \sin^2 x \rightarrow ①$

we know $\sin^2\theta + \cos^2\theta = 1$

$\Rightarrow \cos^2\theta = 1 - \sin^2\theta$.

$\therefore$ From ① $\sin x = \cos^2 x$

Now find the value of $\cos^2 x + \cos^4 x$

$\Rightarrow \cos^2 x + (\cos^2 x)^2$

$\Rightarrow \sin x + (\sin x)^2$

$= \sin x + \sin^2 x$

$= 1$.

⑩ we have to find out the value of

$\cot\theta - \tan\theta$

$\Rightarrow \dfrac{\cos\theta}{\sin\theta} - \dfrac{\sin\theta}{\cos\theta} \Rightarrow \dfrac{\cos^2\theta - \sin^2\theta}{\cos\theta \sin\theta}$ $\left[\begin{array}{l}\cos^2\theta + \sin^2\theta = 1 \\ \sin^2\theta = 1 - \cos^2\theta\end{array}\right]$

$\Rightarrow \dfrac{\cos^2\theta - (1 - \cos^2\theta)}{\cos\theta \sin\theta} = \dfrac{\cos^2\theta - 1 + \cos^2\theta}{\sin\theta \cos\theta}$

$\Rightarrow \dfrac{2\cos^2\theta - 1}{\sin\theta \cos\theta}$.

⑪ Ⓐ From $\sec^2\theta - \tan^2\theta = 1$

$\Rightarrow \sec^2\theta = 1 + \tan^2\theta$.

Ⓑ $1 + \dfrac{\sin^2\theta}{\cos^2\theta} = \sec^2\theta$

L.H.S

$\Rightarrow 1 + \left(\dfrac{\sin\theta}{\cos\theta}\right)^2$

$\Rightarrow 1 + \tan^2\theta$

$= \sec^2\theta =$ R.H.S

Ⓒ we know that

$\sin^2\theta + \cos^2\theta = 1 \rightarrow$ L.H.S

R.H.S $\rightarrow \sec^2\theta \times \cos^2\theta$

$\Rightarrow \dfrac{1}{\cancel{\cos^2\theta}} \times \cancel{\cos^2\theta}$

$= 1$ $\therefore$ L.H.S = R.H.S

Ⓓ R.H.S $\Rightarrow \dfrac{\sec^2\theta}{\cos^2\theta} \Rightarrow \sec^2\theta \times \dfrac{1}{\cos^2\theta}$

$= \sec^2\theta \times \sec^2\theta = \sec^4\theta$ (or) $\dfrac{1}{\cos^4\theta}$.

L.H.S $\neq$ R.H.S