Q1 $\sin x = \frac{2\sqrt{5}}{5}$ find $\csc x$.

$\csc\theta = \frac{1}{\sin\theta}$

$\csc x = \frac{1}{\sin x} \rightarrow$ (Give).

$= 1 / \frac{2\sqrt{5}}{5}$

$\csc x = \frac{5}{2\sqrt{5}}$

(2) $\tan a = \frac{\sqrt{2}}{2}$ and $\sin a = -\sqrt{3}/3$ $\cos a = ?$

$\cos a = \frac{\sin a}{\tan a}$

$= -\frac{\sqrt{3}}{3} \div \frac{\sqrt{2}}{2}.$

$= -\frac{\sqrt{3}}{3} * \frac{2}{\sqrt{2}}$

$= \frac{-2\sqrt{3} * \sqrt{2}}{3\sqrt{2} * \sqrt{2}}.$

$\cos a = -\frac{2\sqrt{6}}{6}$

Q3) $\cot x = -\frac{\sqrt{3}}{2}$ and $\cos x < 0$.

$\sin x = ?$

$\cot \theta = \frac{1}{\tan \theta}$.

$\tan \theta = \frac{1}{\cot \theta}$

$\tan x = \frac{-2}{\sqrt{3}}$.

$\sin \theta = \tan \theta \cos \theta$.

$\sin x = \frac{-2}{\sqrt{3}} \times \frac{\pi}{2}$

$= \frac{-\pi}{\sqrt{3}}$.

Q4) $\cos \theta = \frac{1}{7}$ $\sin \theta < 0$; $\cot \theta = ?$

$\cot \theta = \frac{1}{\tan \theta}$ $\therefore \cot \theta = \frac{\cos \theta}{\sin \theta}$.

$\tan \theta = \frac{\sin \theta}{\cos \theta}$

$\cot \theta = \frac{1}{7} \div \frac{\pi}{1}$

$\cot \theta = \frac{1}{7\pi}$

Scanned with CamScanner

Q5) $\cot\left(\frac{\pi}{2}-x\right) = -1.84$ $\tan(-x)$?

from confunctional identities;

$\tan\theta = \cot\left(\frac{\pi}{2}-\theta\right)$

so, $\tan x = \cot\left(\frac{\pi}{2}-x\right)$

$\therefore$ $\tan x = -1.84$

from even-odd identities;

$\tan(-x) = -\tan x$

$\frac{\tan x}{-1} = \frac{-1.84}{-1}$

$-\tan x = 1.84 = \tan(-x)$

$\tan(-x) = 1.84$

Scanned with CamScanner

Q6) $\sin\theta = -0.57$, $\cos\left(\theta - \frac{\pi}{2}\right)$?

$\sin\theta = \cos\left(\frac{\pi}{2} - \theta\right)$

$\therefore \quad \frac{\cos\left(\frac{\pi}{2} - \theta\right)}{-1} = \frac{-0.57}{-1}$

$\cos\left(\theta - \frac{\pi}{2}\right) = 0.57$

⑦ $\sec x \cdot \sin^2 x + \cos x$.

$= \frac{1}{\cos x}(1 - \cos^2 x) + \cos x$

$= \frac{1}{\cos x} - \frac{\cos^2 x}{\cos x} + \cos x$.

$= \frac{1}{\cos x} - \cancel{\cos x} + \cancel{\cos x}$

$= \frac{1}{\cos x}$.

Q8) $\frac{\csc \beta - \sin \beta}{\sin \beta}$

$= \frac{\csc \beta}{\sin \beta} - \frac{\sin \beta}{\sin \beta}$

$= \frac{\csc \beta}{\sin \beta} - 1$

but $\frac{1}{\sin \beta} = \csc \beta$

$= \therefore \csc^2 \beta - 1$

$= \csc^2 \beta - 1$

But $\csc^2 \beta = \cot^2 \beta + 1$

$= \cot^2 \beta + 1 - 1$

$= \cot^2 \beta$.

Scanned with CamScanner

Q9) $\frac{\sin y + \sin y \cdot \cot^2 y}{\csc y}$

$$= \frac{\sin y}{\csc y} + \frac{\sin y \cdot \cot^2 y}{\csc y}$$

$$= \sin y \cdot \sin y + \frac{\sin y\,(\csc^2 y - 1)}{\csc y}$$

$$= \sin^2 y + \frac{\sin y \csc^2 y}{\csc y} - \frac{\sin y}{\csc y}$$

$$= \frac{\sin y}{\csc y} - \frac{\sin y}{\csc y} + \frac{\sin y \csc^2 y}{\csc y}$$

$$= \sin y \csc y$$

$$= \cancel{\sin y} * \frac{1}{\cancel{\sin y}}$$

$$= 1$$

Q10) $(\sin\theta+1)(\tan\theta-\sec\theta)$

$= (\sin\theta+1)\left(\frac{\sin\theta}{\cos\theta}-\frac{1}{\cos\theta}\right)$

$= \frac{(\sin\theta+1)(\sin\theta-1)}{(\cos\theta)}$

$= \frac{\sin^2\theta-1}{\cos\theta}$

$= \frac{-\cos^2\theta}{\cos\theta}$

$= -\cos\theta$

Scanned with CamScanner

(11) $\frac{1+\sec^2 x}{1+\tan^2 x} = 1+\cos^2 x$

$= \tan^2\theta = -1+\sec^2\theta$

$\therefore \frac{1+\sec^2 x}{1-1+\sec^2 x}$

$= \frac{1+\sec^2 x}{\sec^2 x}$

$= \frac{1}{\sec^2 x} + \frac{\sec^2 x}{\sec^2 x}$

$= \frac{1}{\sec^2 x} + 1$

But $(\cos x)^2 = \left(\frac{1}{\sec x}\right)^2$

Hence $\cos^2 x = \frac{1}{\sec^2 x}$

Therefore, we can replace $\frac{1}{\sec^2 x}$ with $\cos^2 x$ to get $\cos^2 x + 1$

hence $\frac{1+\sec^2 x}{1+\tan^2 x} = 1+\cos^2 x$ ▨

Scanned with CamScanner

(12)

$$\frac{\sin a}{1-\cos a} - \cot a = \csc a$$

$$= \frac{\sin a}{1-\cos a} - \frac{\cos a}{\sin a}$$

$$= \frac{\sin^2 a - \cos a(1-\cos a)}{(1-\cos a)(\sin a)}$$

$$= \frac{\sin^2 a - \cos a + \cos^2 a}{(1-\cos a)(\sin a)}$$

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

$$\therefore \frac{\cancel{(1-\cos a)}}{\cancel{(1-\cos a)}(\sin a)}$$

$$= \frac{1}{\sin a}$$

From receprocal identities,

$$\csc\theta = \frac{1}{\sin\theta}$$

$$\therefore \frac{1}{\sin a} = \csc a \quad \blacksquare$$

Scanned with CamScanner