TRIGONOMETRICAL RATIOS OF ASSOCIATED ANGLES

Q $\sin\theta = \frac{3}{5}$ এবং $90° < \theta < 180°$ হলে $\tan\theta$ এর মান কত?

সমাধানঃ

আমরা জানি,

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

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

$$\Rightarrow cos^2\,\theta = 1 - \left(\frac{3}{5}\right)^2$$

$$\Rightarrow cos^2\,\theta = 1 - \frac{9}{25}$$

$$\Rightarrow cos^2\,\theta = \frac{25-9}{25}$$

$$\Rightarrow cos^2\,\theta = \frac{16}{25}$$

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

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

$$= \frac{\frac{3}{5}}{\frac{4}{5}} = \frac{3}{5} \times \frac{5}{4}$$

$$= \frac{3}{4}$$

যেহেতু $90° < \theta < 180°$ সুতরাং $\tan\theta = -\frac{3}{4}$

Q $cos^2 10° + cos^2 80°$ এর মান কত?

সমাধানঃ

$$cos^2 10° + cos^2 80°$$
$$= cos^2 10° + (\cos 80°)^2$$
$$= cos^2 10° + \{\cos(90° - 10°\}^2$$
$$= cos^2 10° + (\sin 10°)^2$$
$$= cos^2 10° + sin^2 10°$$
$$= 1 \quad \text{Ans}$$

Q $\sin 90° + cos\theta = \frac{3}{2}$ হলে θএর মান কত?

সমাধানঃ $\sin 90° + cos\theta = \frac{3}{2}$

$$\Rightarrow 1 + cos\theta = \frac{3}{2}$$

$$\Rightarrow 1 + cos\theta = \frac{3}{2}$$

$$\Rightarrow cos\theta = \frac{3}{2} - 1$$

$$\Rightarrow cos\theta = \frac{1}{2}$$

$$\Rightarrow cos\theta = \cos 60°$$

$$\Rightarrow \theta = 60°$$

Q Cos A= $\frac{\sqrt{3}}{2}$ এবং A + B = 90° হলে $sinB$ এর মান নির্ণয় কর?

সমাধানঃ

দেওয়া আছে A + B = 90°

$\Rightarrow$ A = 90° $- B$

$$\text{Cos A} = \frac{\sqrt{3}}{2}$$

$$\Rightarrow \text{Cos}\,(90° - B) = \frac{\sqrt{3}}{2}$$

$$\Rightarrow \sin B = \frac{\sqrt{3}}{2}$$

$$\Rightarrow \sin B = \sin 60°$$

$$\Rightarrow B = 60°$$

Q $\sin\theta = \frac{1}{2}$ হলে এবং $90° < \theta < 180°$ হলে $\cot\theta$ এর মান কত

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

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

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

$$\Rightarrow \cos\theta = \sqrt{1 - \left(\frac{1}{2}\right)^2}$$

$$\Rightarrow \cos\theta = \sqrt{1 - \frac{1}{4}}$$

$$\Rightarrow \cos\theta = \sqrt{\frac{4-1}{4}}$$

$$\Rightarrow \cos\theta = \sqrt{\frac{3}{4}}$$

$$\Rightarrow \cos\theta = \frac{\sqrt{3}}{2}$$

$$\cot\theta = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}$$

$$= \frac{\sqrt{3}}{2} \times \frac{2}{1}$$

$$= \frac{\sqrt{3}}{2} \times \frac{2}{1}$$

$$= \sqrt{3}$$

যেহেতু $90° < \theta < 180°$ সুতরাং $\cot\theta = -\sqrt{3}$

Q $sec^2 10° - cot^2 80°$ এর মান কত?

Q $sec^2 10° - cot^2 80°$ এর মান কত?

সমাধানঃ

$$sec^2 10° - cot^2 80°$$

$$= sec^2 10° - (\cot 80°)^2$$

$$= sec^2 10° - \{\cot(90° - 10°\}^2$$

$$= sec^2 10° - (\tan 10°)^2$$

$$= sec^2 10° - tan^2 10°$$

$$= 1$$ Ans