SpeedLabs

MATHS

CBSE 10th

TEEVRA EDUTECH PVT. LTD.

Introduction to trigonometry
Exercise-8.3

Q.1 Evaluate

(i) $\frac{\sin 18^\circ}{\cos 72^\circ}$

(ii) $\frac{\tan 26^\circ}{\cot 64^\circ}$

(iii) $\cos 48^\circ - \sin 42^\circ$

(iv) $\operatorname{cosec} 31^\circ - \sec 59^\circ$

Sol:

(i) $\frac{\sin 18^\circ}{\cos 72^\circ} = \frac{\sin(90^\circ - 72)}{\cos 72^\circ}$

$= \frac{\cos 72^\circ}{\cos 72^\circ} = 1$

(ii) $\frac{\tan 26^\circ}{\cot 64^\circ} = \frac{\tan(90^\circ - 64^\circ)}{\cot 64^\circ} = \frac{\cot 64^\circ}{\cot 64^\circ} = 1$

(iii) $\cos 48^\circ - \sin 42^\circ = \cos (90^\circ - 42^\circ) - \sin 42^\circ$

$= \sin 42^\circ - \sin 42^\circ$

$= 0$

(iv) $\operatorname{cosec} 31^\circ - \sec 59^\circ = \operatorname{cosec} (90^\circ - 59^\circ) - \sec 59^\circ$

$= \sec 59^\circ - \sec 59^\circ$

$= 0$

Q.2 Show that

(I) $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1$

(II) $\cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ = 0$

Sol:

(I) $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ$

$= \tan (90^\circ - 42^\circ) \tan (90^\circ - 67^\circ) \tan 42^\circ \tan 67^\circ$

$= \cot 42^\circ \cot 67^\circ \tan 42^\circ \tan 67^\circ$

$= (\cot 42^\circ \tan 42^\circ) (\cot 67^\circ \tan 67^\circ)$

$= (1)(1) = 1$

(II) $\cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ$

$= \cos (90^\circ - 52^\circ) \cos (90^\circ - 38^\circ) - \sin 38^\circ \sin 52^\circ$

$= \sin 52^\circ \sin 38^\circ - \sin 38^\circ \sin 52^\circ = 0$

Q.3 If $\tan 2A = \cot (A - 18°)$, where 2A is an acute angle, find the value of A.

Sol: Given that,

$\tan 2A = \cot (A - 18°)$

$\cot (90° - 2A) = \cot (A - 18°)$

$90° - 2A = A - 18°$

$108° = 3A$

$A = 36°$

Q.4 If $\tan A = \cot B$, prove that $A + B = 90°$

Sol: Given that,

$\tan A = \cot B$

$\tan A = \tan (90° - B)$

$A = 90° - B$

$A + B = 90°$

Q.5 If $\sec 4A = \operatorname{cosec} (A - 20°)$, where 4A is an acute angle, find the value of A.

Sol: Given that,

$\sec 4A = \operatorname{cosec} (A - 20°)$

$\operatorname{cosec} (90° - 4A) = \operatorname{cosec} (A - 20°)$

$90° - 4A = A - 20°$

$110° = 5A$

$A = 22°$

Q.6 If A, Band C are interior angles of a triangle ABC then show that $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$

Sol: We know that for a triangle ABC,

$\angle A + \angle B + \angle C = 180°$

$\angle B + \angle C = 180° - \angle A$

$\sin\left(\frac{B + C}{2}\right) = \sin\left(90° - \frac{A}{2}\right) = \cos\left(\frac{A}{2}\right)$

Q.7 Express $\sin 67° + \cos 75°$ in terms of trigonometric ratios of angles between 0° and 45°.

Sol: $\sin 67° + \cos 75°$

$= \sin (90° - 23°) + \cos (90° - 15°)$

$= \cos 23° + \sin 15°$