

Chapter 5 Trigonometric Functions Ex 5.3 Q 2.i

$$= \tan\left(\pi + \frac{\pi}{4}\right)\cot\left(2\pi + \frac{\pi}{4}\right) + \tan\left(4\pi + \frac{\pi}{4}\right)\cot\left(4\pi - \frac{\pi}{4}\right)$$

$$= \tan\frac{\pi}{4}.\cot\frac{\pi}{4} + \tan\frac{\pi}{4} \times \left(-\cot\frac{\pi}{4}\right)$$

$$= 1.1 + 1.\left(-1\right)$$

$$(\because \cot\left(4\pi - \frac{\pi}{4}\right) = -\cot\frac{\pi}{4}\right)$$

$$= 1.1 + 1.\left(-1\right)$$

= 0

= RHS

Proved

Chapter 5 Trigonometric Functions Ex 5.3 Q 2.ii

LHS =
$$sin \frac{8\pi}{3} cos \frac{23\pi}{6} + cos \frac{13\pi}{3} sin \frac{35\pi}{6}$$

= $sin \left(3\pi - \frac{\pi}{3}\right) cos \left(4\pi - \frac{\pi}{6}\right) + cos \left(4\pi + \frac{\pi}{3}\right) sin \left(6\pi - \frac{\pi}{6}\right)$
= $sin \frac{\pi}{3} cos \frac{\pi}{6} + cos \frac{\pi}{3} \left(-sin \frac{\pi}{6}\right)$ (... $sin \left(6\pi - \theta\right) = -sin \theta$)
= $\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{22} + \frac{1}{2} \times \left(\frac{-1}{2}\right)$
= $\frac{3}{4} - \frac{1}{4}$
= $\frac{2}{4}$
= $\frac{1}{2}$
= RHS
Proved

Chapter 5 Trigonometric Functions Ex 5.3 Q 2.iii

LHS =
$$\cos 24^{\circ} + \cos 55^{\circ} + \cos 125^{\circ} + \cos 204^{\circ} + \cos 300^{\circ}$$

= $\cos 24^{\circ} + \cos 204^{\circ} + \cos 55^{\circ} + \cos 125^{\circ} + \cos 300^{\circ}$
= $\cos 24^{\circ} + \cos \left(\pi + 24^{\circ}\right) + \cos 55^{\circ} + \cos \left(\pi - 55^{\circ}\right) + \cos \left(2\pi - \frac{\pi}{3}\right)$
= $\cos 24^{\circ} - \cos 24^{\circ} + \cos 55^{\circ} - \cos 55^{\circ} + \cos \frac{\pi}{3}$
= $\cos \frac{\pi}{3}$
= $\frac{1}{2}$
= RHS
Proved

Chapter 5 Trigonometric Functions Ex 5.3 Q 1 2.iv

LHS =
$$tan(-225^{\circ})cot(-405^{\circ}) - tan(-765^{\circ})cot(675^{\circ})$$

= $-tan 225^{\circ}(-cot 405^{\circ}) + tan 765^{\circ}cot 765^{\circ}$ $\left(\because tan(-\theta) = -tan \theta\right)$
= $tan\left(\pi + \frac{\pi}{4}\right)cot\left(2\pi \frac{\pi}{4}\right) + tan\left(4\pi + \frac{\pi}{4}\right)cot\left(4\pi - \frac{\pi}{4}\right)$
= $tan\frac{\pi}{4}cot\frac{\pi}{4} + tan\frac{\pi}{4} \times \left(-cot\frac{\pi}{4}\right)$ $\left(\because cot(4\pi - \theta) = -cot\theta\right)$
= $1 \cdot 1 + 1(-1)$
= $1 - 1$
= 0
= RHS

Chapter 5 Trigonometric Functions Ex 5.3 Q 2.v

LHS =
$$\cos 570^{\circ} \sin 510^{\circ} + \sin \left(-330^{\circ}\right) \cos \left(-390^{\circ}\right)$$

= $\cos \left(3\pi + \frac{\pi}{6}\right) \sin \left(3\pi - \frac{\pi}{6}\right) - \sin 330^{\circ} \cos 390^{\circ}$ $\left(\because \sin \left(-\theta\right) = -\sin \theta \text{ and }\right)$
= $-\cos \frac{\pi}{6} \sin \frac{\pi}{6} - \sin \left(2\pi - \frac{\pi}{6}\right) \cos \left(2\pi + \frac{\pi}{6}\right)$
= $-\sin \frac{\pi}{6} \cos \frac{\pi}{6} + \sin \frac{\pi}{6} \cdot \cos \frac{\pi}{6}$ $\left(\because \sin \left(2\pi - \theta\right) = -\sin \theta\right)$
= 0
= RHS
Proved

Chapter 5 Trigonometric Functions Ex 5.3 Q 2.vi LHS =
$$tan \frac{11\pi}{3} - 2 sin \frac{4\pi}{6} - \frac{3}{4} cos ec^2 \frac{\pi}{4} + 4 cos^2 \frac{17\pi}{6}$$
 = $tan \left(4\pi - \frac{\pi}{3}\right) - 2 sin \frac{2\pi}{3} - \frac{3}{4} \times \left(\sqrt{2}\right)^2 + 4 cos^2 \left(3\pi - \frac{\pi}{6}\right)$ = $-tan \frac{\pi}{3} - 2 sin \left(\pi - \frac{\pi}{3}\right) - \frac{3}{4} \times 2 + 4 cos^2 \frac{\pi}{6}$ \(\begin{align*} \tau tan \left(4\pi - \frac{\pi}{3}\right) = -tan \frac{\pi}{3}, \cos \left(3\pi - \frac{\pi}{6}\right) = -cos \frac{\pi}{6}\right) \] = $-\sqrt{3} - 2 sin \frac{\pi}{3} - \frac{3}{2} + 4 \times \left(\frac{\sqrt{3}}{2}\right)^2$ = $-\sqrt{3} - 2 sin \frac{\pi}{3} - \frac{3}{2} + 4 \times \frac{3}{4}$ = $-\sqrt{3} - \sqrt{3} - \frac{3}{2} + 3$ = $-2\sqrt{3} - \frac{3}{2} + 3$ = $-2\sqrt{3} - \frac{3}{2} + \frac{3}{2}$ = $-2\sqrt{3} + \frac{3}{2}$ = $-2\sqrt{3} + \frac{3}{2}$ = RHS Proved

Chapter 5 Trigonometric Functions Ex 5.3 Q 2.vii

LHS =
$$3 \sin \frac{\pi}{6} \sec \frac{\pi}{3} - 4 \sin \frac{5\pi}{6} \cot \frac{\pi}{4}$$

= $3 \times \frac{1}{2} \times 2 - 4 \sin \left(\pi - \frac{\pi}{6}\right) \times 1$
= $3 - 4 \sin \frac{\pi}{6}$ $\left(\because \sin \left(\pi - \theta\right) = \sin \theta\right)$
= $3 - 4 \times \frac{1}{2}$
= $3 - 2$
= 1
= RHS
Proved

****** END ******