



Chapter 5 Trigonometric Functions Ex 5.3 Q 7

$\therefore A, B, C, D$ are the angles of a cyclic quadrilateral in order,

$\therefore A + C = \pi$ & $B + D = \pi$

$$\Rightarrow \pi - A = C \text{ \& \> } \pi - D = B$$

$$\Rightarrow \cos(\pi - A) = \cos C \dots\dots\dots(i)$$

$$\& \cos(\pi - D) = \cos B \dots\dots\dots(ii)$$

$$\text{Now, } \cos(180^\circ - A) + \cos(180^\circ + B) + (180^\circ + C) - \sin(90^\circ + D)$$

$$= \cos C + (-\cos B) - \cos C - \cos D$$

$$(\because \cos(180^\circ + B) = -\cos B, \cos(180^\circ + C) = -\cos C \& \text{ using (i)})$$

$$= -\cos B - \cos D$$

$$= -\cos B - (-\cos B) \text{ (using (ii))}$$

$$= -\cos B + \cos B$$

$$= 0$$

Proved

Chapter 5 Trigonometric Functions Ex 5.3 Q 8i.

$$\operatorname{cosec}(90^\circ + \theta) + x \cos \theta \cot(90^\circ + \theta) = \sin(90^\circ + \theta)$$

$$\Rightarrow \sec \theta + x \cos \theta \times (-\tan \theta) = \cos \theta$$

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

$$\Rightarrow \frac{1}{\cos \theta} - x \sin \theta = \cos \theta$$

$$\Rightarrow \frac{1 - x \sin \theta \cos \theta}{\cos \theta} = \cos \theta$$

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

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

$$\Rightarrow \sin^2 \theta = x \sin \theta \cos \theta$$

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

$$\Rightarrow x = \frac{\sin \theta}{\cos \theta}$$

$$= \tan \theta$$

Hence $x = \tan \theta$

Chapter 5 Trigonometric Functions Ex 5.3 Q 8. ii.

We have $x \cot (90^\circ + \theta) + \tan (90^\circ + \theta) \sin \theta + \operatorname{cosec} (90^\circ + \theta) = 0$

$$\Rightarrow x (-\tan \theta) - \cot \theta \times \sin \theta + \sec \theta = 0$$

$$\Rightarrow -x \tan \theta - \frac{\cos \theta}{\sin \theta} \times \sin \theta + \frac{1}{\cos \theta} = 0$$

$$\Rightarrow -x \frac{\sin \theta}{\cos \theta} - \cos \theta + \frac{1}{\cos \theta} = 0$$

$$\Rightarrow \frac{-x \sin \theta - \cos^2 \theta + 1}{\cos \theta} = 0$$

$$\Rightarrow -x \sin \theta + 1 - \cos^2 \theta = 0$$

$$\Rightarrow -x \sin \theta + \sin^2 \theta = 0$$

$$\Rightarrow x \sin \theta = \sin^2 \theta$$

$$\Rightarrow x = \frac{\sin^2 \theta}{\sin \theta}$$

$$\Rightarrow x = \sin \theta$$

***** END *****