



Chapter 5 Trigonometric Functions Ex 5.3 Q 1.viii

$$\begin{aligned}
 \sin(-330^\circ) &= \sin\left(-\left(2\pi - \frac{\pi}{6}\right)\right) \\
 &= \sin\left(2\pi - \frac{\pi}{6}\right) && (\because \sin(-\theta) = -\sin\theta) \\
 &= -\left(-\sin\frac{\pi}{6}\right) && (\because \sin(2\pi - \theta) = -\sin\theta) \\
 &= \sin\frac{\pi}{6} \\
 &= \frac{1}{2}
 \end{aligned}$$

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$$\begin{aligned}
 \operatorname{cosec}(-1200^\circ) &= \operatorname{cosec}\left(-\left(7\pi - \frac{\pi}{3}\right)\right) \\
 &= \operatorname{cosec}\left(7\pi - \frac{\pi}{3}\right) && (\because \operatorname{cosec}(-\theta) = -\operatorname{cosec}\theta) \\
 &= -\operatorname{cosec}\left(2 \times 3\pi + \left(\pi - \frac{\pi}{3}\right)\right) \\
 &= -\operatorname{cosec}\left(\pi - \frac{\pi}{3}\right) && \left(\because \operatorname{cosec} \text{ is periodic of period } 2\pi, \right. \\
 & && \left. \therefore \operatorname{cosec}(2\pi + \theta) = \operatorname{cosec}(2n\pi + \theta) = \operatorname{cosec}\theta \text{ for all } n \in \mathbb{N}\right) \\
 &= -\operatorname{cosec}\frac{\pi}{3} && (\because \operatorname{cosec}(\pi - \theta) = \operatorname{cosec}\theta) \\
 &= \frac{-2}{\sqrt{3}}
 \end{aligned}$$

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$$\begin{aligned}
 \tan(-585^\circ) &= -\tan(585^\circ) && (\because \tan(-\theta) = -\tan\theta) \\
 &= -\tan\left(3\pi + \frac{\pi}{4}\right) \\
 &= -\tan\left(2\pi + \left(\pi + \frac{\pi}{4}\right)\right) && (\because \tan(2\pi + \theta) = \tan\theta) \\
 &= -\tan\frac{\pi}{4} && (\because \tan(\pi + \theta) = \tan\theta) \\
 &= -1
 \end{aligned}$$

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$$\begin{aligned}
 \cos(855^\circ) &= \cos\left(5\pi - \frac{\pi}{4}\right) \\
 &= \cos\left(2 \times 2\pi + \left(\pi - \frac{\pi}{4}\right)\right) \\
 &= \cos\left(\pi - \frac{\pi}{4}\right) && (\because \cos(2k\pi + \theta) = \cos\theta \text{ for all } k \in \mathbb{N}) \\
 &= -\cos\frac{\pi}{4} && (\because \cos(\pi - \theta) = -\cos\theta) \\
 &= \frac{-1}{\sqrt{2}}
 \end{aligned}$$

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$$\begin{aligned}
 \sin 1845^\circ &= \sin \left(10\pi + \frac{\pi}{4} \right) \\
 &= \sin \left(2 \times 5\pi + \frac{\pi}{4} \right) \\
 &= \sin \pi \quad \left(\because \sin (2k\pi + \theta) = \sin \theta, \text{ for all } k \in \mathbb{N} \right) \\
 &= \frac{1}{\sqrt{2}}
 \end{aligned}$$

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$$\begin{aligned}
 \cos 1755^\circ &= \cos \left(10\pi - \frac{\pi}{4} \right) \\
 &= \cos \left(2 \times 5\pi - \frac{\pi}{4} \right) \\
 &= \cos \frac{\pi}{4} \quad \left(\because \cos (2k\pi - \theta) = \cos \theta, k \in \mathbb{N} \right) \\
 &= \frac{1}{\sqrt{2}}
 \end{aligned}$$

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$$\begin{aligned}
 4530^\circ &= \left(25\pi + \frac{\pi}{6} \right) \\
 \therefore \sin 4530 &= \sin \left(25\pi + \frac{\pi}{6} \right) \\
 &= \sin \left(2 \times 12\pi + \left(\pi + \frac{\pi}{6} \right) \right) \\
 &= \sin \left(\pi + \frac{\pi}{6} \right) \quad \left(\because \sin (2k\pi + \theta) = \sin \theta, k \in \mathbb{N} \right) \\
 &= -\sin \frac{\pi}{6} \quad \left(\because \sin (\pi + \theta) = -\sin \theta \right) \\
 &= -\frac{1}{2}
 \end{aligned}$$

***** END *****