

Math 002-01 Quiz 1
Solution

(A)

Q.1: Let $\alpha = 35^\circ 52' 48''$ and $\beta = 43^\circ 45' 29''$. Find $\alpha + \beta$, complement of α and supplement of β .

Sol: $\alpha + \beta = 35^\circ 52' 48'' + 43^\circ 45' 29'' = 79^\circ 38' 17''$.

Complement of $\alpha = 90^\circ 00' 00'' - 35^\circ 52' 48'' = 54^\circ 07' 12''$

Supplement of $\beta = 180^\circ 00' 00'' - 43^\circ 45' 29'' = 136^\circ 14' 31''$

Q.2: Convert $\alpha + \beta$ to decimal degree.

Sol: $\alpha + \beta = 79^\circ 38' 17'' = \left(79 + \frac{38}{60} + \frac{17}{3600}\right)^\circ = 79.638^\circ$.

Q.3: A wheel is rotating at 35 revolutions per minute. Find the angular speed in radians per second.

Sol: $w = 35 \text{ rev/min} = \frac{(35)(2\pi)}{60} \text{ rad/sec} = \frac{70\pi}{60} \text{ rad/sec} = \frac{7\pi}{6} \text{ rad/sec}$.

Q.4: Find the value of $\sin 120^\circ \cos 120^\circ + \sec \frac{11\pi}{6} \csc \frac{5\pi}{4}$.

Sol: $\sin 120^\circ \cos 120^\circ + \sec \frac{11\pi}{6} \csc \frac{5\pi}{4} = \sin 60^\circ (-\cos 60^\circ) + \sec \frac{\pi}{6} \left(-\csc \frac{\pi}{4}\right)$
 $= \frac{\sqrt{3}-1}{2} + \frac{2}{\sqrt{3}} (-\sqrt{2}) = \frac{-\sqrt{3}}{4} - \frac{2\sqrt{6}}{3}$.

Q.5: If $(-3, 4)$ is a point on the terminal side of θ , find $\sin \theta$, $\cos \theta$, $\tan \theta$.

Sol: $x = -3$, $y = 4$, and $r = \sqrt{9 + 16} = 5$.

$\sin \theta = \frac{4}{5}$, $\cos \theta = \frac{-3}{5}$, $\tan \theta = -\frac{4}{3}$.

Q.6: If $\sin \theta = -\frac{1}{2}$ and $\cos \theta > 0$, find $\tan \theta$.

Sol: sine is negative and cosine is positive, so quadrant is *IV*

$\cos \theta = \sqrt{1 - \sin^2 \theta} = \sqrt{1 - \frac{1}{4}} = \frac{\sqrt{3}}{2}$

$\tan \theta = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$.