Honors Precalculus

Name KEY

Finding ALL Solutions for sin & cos (NOTES)

Date_____ Period____

Find all solutions to each equation in degrees.

1) $\frac{-8+\sqrt{2}}{2} = -4 + \cos\theta$ PER=360°

$\frac{\sqrt{2}}{2} = \cos\theta$

$\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \theta$

$45° = \theta$

$360° - 45° = 315°$

$\theta = 45° + 360°n$

$\theta = 315° + 360°n$

2) $\frac{10-\sqrt{3}}{2} = 5 + \cos 2\theta$ PER=180°

$-5 \quad -5$

$-\frac{\sqrt{3}}{2} = \cos 2\theta$

$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = 2\theta$

$150° = 2\theta$

$75° = \theta$

$180° - 75° = 105°$

$\theta = 75° + 180°n$

$\theta = 105° + 180°n$

3) $\frac{8}{8}\sin\theta = \frac{-4}{8}$ PER= 360°

$\sin\theta = -\frac{1}{2}$

$\theta = \sin^{-1}\left(-\frac{1}{2}\right)$

$\theta = -30°$

$180 - -30 = 210°$

$\theta = -30° + 360°n$

$\theta = 210° + 360°n$

4) $-3 + \sin -2\theta = -\frac{5}{2}$ PER = −180°

$+3 \quad +3$

$\sin -2\theta = \frac{1}{2}$

$-2\theta = \sin^{-1}(1/2)$

$-2\theta = 30°$

$\theta = -15°$

$-90° - -15° = -75°$

$\theta = -15° + 180°n$

$\theta = -75° + 180°n$

Find all solutions to each equation in radians.

5) $-3\cos\theta = -3$ PER = 2π

$\cos\theta = 1$

$\theta = \cos^{-1}(1)$

$\theta = 0\pi$

$2\pi - 0\pi = 2\pi$

$\theta = 0\pi + 2\pi n$

OR

$\theta = 2\pi n$

6) $-8\cos 4\theta = 4\sqrt{3}$ PER = $\pi/2$

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

$4\theta = \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

$4\theta = \frac{5\pi}{6}$

$\theta = \frac{5\pi}{24}$

$\frac{\pi}{2} - \frac{5\pi}{24} \rightarrow \frac{12\pi}{24} - \frac{5\pi}{24} = \frac{7\pi}{24}$

$\theta = \frac{5\pi}{24} + \frac{\pi}{2}n$

$\theta = \frac{7\pi}{24} + \frac{\pi}{2}n$

7) $-\frac{5}{2} = -2 + \sin\theta$ PER = 2π

$+2 \quad +2$

$-\frac{1}{2} = \sin\theta$

$\sin^{-1}\left(-\frac{1}{2}\right) = \theta$

$-\frac{\pi}{6} = \theta$

$\pi - -\frac{\pi}{6} \rightarrow \frac{6\pi}{6} - -\frac{\pi}{6} = \frac{7\pi}{6}$

$\theta = -\frac{\pi}{6} + 2\pi n$

$\theta = \frac{7\pi}{6} + 2\pi n$

8) $-3\sqrt{3} = 6\sin 2\theta$ PER = π

$-\frac{\sqrt{3}}{2} = \sin 2\theta$

$\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = 2\theta$

$-\frac{\pi}{3} = 2\theta$

$-\frac{\pi}{6} = \theta$

$\frac{\pi}{2} - -\frac{\pi}{6} \rightarrow \frac{3\pi}{2} - -\frac{\pi}{6} = \frac{4\pi}{6} = \frac{2\pi}{3}$

$\theta = -\frac{\pi}{6} + \pi n$

$\theta = \frac{2\pi}{3} + \pi n$