Pre-Calculus A
Section 5.3 Multiple Angles Homework

Name : Key
Date : _____ Period : ____

Solve the following trigonometric equations. Please solve **everywhere** if no interval is noted.

1) $2\sin 2x - 1 = 0$

$\sin 2x = \frac{1}{2}$

$2x = \frac{\pi}{6} + 2\pi n \qquad 2x = \frac{5\pi}{6} + 2\pi n$

$x = \frac{\pi}{6}\cdot\frac{1}{2} + \frac{2\pi n}{2} \qquad x = \frac{5\pi}{6}\cdot\frac{1}{2} + \frac{2\pi n}{2}$

$x = \frac{\pi}{12} + \pi n \qquad x = \frac{5\pi}{12} + \pi n$

2) $\sin 2x = -\frac{\sqrt{3}}{2}$

$2x = \frac{4\pi}{3} + 2\pi n \qquad 2x = \frac{5\pi}{3} + 2\pi n$

$x = \frac{4\pi}{3}\cdot\frac{1}{2} + \pi n \qquad x = \frac{5\pi}{3}\cdot\frac{1}{2} + \pi n$

$x = \frac{4\pi}{6} + \pi n \qquad x = \frac{5\pi}{6} + \pi n$

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

3) $2\cos^2 2x = 1$ on $[0, 2\pi)$

$\cos^2 2x = \frac{1}{2}$

$\cos 2x = \pm\sqrt{\frac{1}{2}}$

$\cos 2x = \pm\frac{1}{\sqrt{2}}$

$\cos 2x = \pm\frac{\sqrt{2}}{2}$

$2x = \frac{\pi}{4} \qquad 2x = \frac{3\pi}{4} \qquad 2x = \frac{5\pi}{4} \qquad 2x = \frac{7\pi}{4}$

$x = \frac{\pi}{8} \qquad x = \frac{3\pi}{8} \qquad x = \frac{5\pi}{8} \qquad x = \frac{7\pi}{8}$

4) $\tan^2 3x = 3$ on $[0, 2\pi)$

$\tan 3x = \pm\sqrt{3}$

$3x = \frac{\pi}{3} \qquad 3x = \frac{2\pi}{3} \qquad 3x = \frac{4\pi}{3} \qquad 3x = \frac{5\pi}{3}$

$x = \frac{\pi}{3}\cdot\frac{1}{3} \qquad x = \frac{2\pi}{3}\cdot\frac{1}{3} \qquad x = \frac{4\pi}{3}\cdot\frac{1}{3} \qquad x = \frac{5\pi}{3}\cdot\frac{1}{3}$

$x = \frac{\pi}{9} \qquad x = \frac{2\pi}{9} \qquad x = \frac{4\pi}{9} \qquad x = \frac{5\pi}{9}$

5) $\sec 4x = 2$

$\cos 4x = \frac{1}{2}$

$4x = \frac{\pi}{3} + 2\pi n \qquad 4x = \frac{5\pi}{3} + 2\pi n$

$x = \frac{\pi}{3}\cdot\frac{1}{4} + \frac{\pi n}{2} \qquad x = \frac{5\pi}{3}\cdot\frac{1}{4} + \frac{\pi n}{2}$

$x = \frac{\pi}{12} + \frac{\pi n}{2} \qquad x = \frac{5\pi}{12} + \frac{\pi n}{2}$

6) $\sin 2x(2\sin x + 1) = 0$ on $[0, 2\pi)$

$\sin 2x = 0 \qquad 2\sin x + 1 = 0$

$2x = 0 \qquad 2x = \pi \qquad \sin x = -\frac{1}{2}$

$x = 0 \qquad x = \frac{\pi}{2} \qquad x = \frac{7\pi}{6}, \frac{11\pi}{6}$

Answer Key:

1) $\frac{\pi}{12}+\pi n,\ \frac{5\pi}{12}+\pi n$

2) $\frac{2\pi}{3}+\pi n,\ \frac{5\pi}{6}+\pi n$

3) $\frac{\pi}{8},\frac{3\pi}{8},\frac{5\pi}{8},\frac{7\pi}{8}$

4) $\frac{\pi}{9},\frac{2\pi}{9},\frac{4\pi}{9},\frac{5\pi}{9}$

5) $\frac{\pi}{12}+\frac{\pi}{2}n,\ \frac{5\pi}{12}+\frac{\pi}{2}n$

6) $0,\frac{\pi}{2},\frac{7\pi}{6},\frac{11\pi}{6}$