Honors Precalculus

Name KEY

Solving Other Trig Equations - NOTES

Date_____ Period____

Solve each equation for $0 \le \theta < 360$.

1) $12\sec\theta = 8\sqrt{3}$ PERIOD = 360°

$\sec\theta = \frac{2\sqrt{3}}{3}$

$\frac{1}{\sec\theta} = \frac{3}{2\sqrt{3}}$

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

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

$\boxed{\theta = 30^\circ}$

$360^\circ - 30^\circ = \boxed{330^\circ}$

2) $\frac{3+2\sqrt{3}}{3} = 1 + \sec -3\theta$ PERIOD = 120°

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

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

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

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

$30^\circ = -3\theta$

$-10^\circ = \theta \xrightarrow{+120} \boxed{110^\circ = \theta}$

$-120^\circ - -10^\circ = -110^\circ \xrightarrow{+120} \boxed{10^\circ = \theta}$

$110^\circ + 120^\circ = \boxed{230^\circ}$ $+120^\circ = \boxed{350^\circ}$

$10^\circ + 120^\circ = \boxed{130^\circ}$ $+120^\circ = \boxed{250^\circ}$

3) $-2\csc\theta = 2\sqrt{2}$ PERIOD = 360°

$\csc\theta = -\sqrt{2}$

$\frac{1}{\csc\theta} = -\frac{1}{\sqrt{2}}$

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

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

$\theta = -45^\circ \xrightarrow{+360^\circ} \boxed{315^\circ = \theta}$

$180^\circ - -45^\circ = \boxed{225^\circ}$

4) $-3 + \csc 3\theta = -1$ PERIOD = 120°

$\csc 3\theta = 2$

$\frac{1}{\csc 3\theta} = \frac{1}{2}$

$\sin 3\theta = \frac{1}{2}$

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

$3\theta = 30^\circ$

$\boxed{\theta = 10^\circ}$

$60^\circ - 10^\circ = \boxed{50^\circ}$

$10^\circ + 120^\circ = \boxed{130^\circ}$ $+120^\circ = \boxed{250^\circ}$

$50^\circ + 120^\circ = \boxed{170^\circ}$ $+120^\circ = \boxed{290^\circ}$

5) $3\sqrt{3} = 3\tan\theta$ PERIOD $= 180°$

$\sqrt{3} = \tan\theta$

$\tan^{-1}(\sqrt{3}) = \theta$

$\boxed{60° = \theta}$

$60° + 180° = \boxed{240°}$

6) $-2\sqrt{3} = 6\tan 3\theta$ PERIOD $= 60°$

$\frac{-\sqrt{3}}{3} = \tan 3\theta$

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

$-30° = 3\theta$

$-10° = \theta \xrightarrow{+60°} \boxed{50° = \theta}$

$50° + 60° = \boxed{110°} + 60° = \boxed{170°} + 60° = \boxed{230°}$

$230° + 60° = \boxed{290°} + 60° = \boxed{350°}$

7) $-2 + \cot\theta = -3$ PERIOD $= 180°$

$\cot\theta = -1$

$\frac{1}{\cot\theta} = \frac{-1}{1}$

$\tan\theta = -1$

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

$\theta = -45° \xrightarrow{+180} \boxed{135°}$

$135° + 180° = \boxed{315°}$

8) $-3\cot -2\theta = 3$ PERIOD $= -90°$

$\cot -2\theta = -1$

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

$\tan -2\theta = -1$

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

$-2\theta = -45°$

$\boxed{\theta = 22.5°}$

$22.5° + 90° = \boxed{112.5°} + 90° = \boxed{202.5°}$

$202.5° + 90° = \boxed{292.5°}$