MATH 1316 MLM Mid-Term Exam Formula Sheet

1 counterclockwise revolution $= 360°$

$1° = 60'$ $\quad 1' = 60''$

$s = r\theta$ $\qquad A = \frac{1}{2}r^2\theta$ $\qquad v = \frac{s}{t}$ $\qquad \omega = \frac{\theta}{t}$ or $v = r\omega$

$y = \sin^{-1} x$ if and only if $x = \sin y$ where $-1 \le x \le 1, \quad -\frac{\pi}{2} \le y \le \frac{\pi}{2}$

$y = \cos^{-1} x$ if and only if $x = \cos y$ where $-1 \le x \le 1, \quad 0 \le y \le \pi$

$y = \tan^{-1} x$ if and only if $x = \tan y$ where $-\infty < x < \infty, \quad -\frac{\pi}{2} < y < \frac{\pi}{2}$

$y = \sec^{-1} x$ if and only if $x = \sec y$ where $|x| \ge 1, \quad 0 \le y \le \pi, \quad y \ne \frac{\pi}{2}$

$y = \csc^{-1} x$ if and only if $x = \csc y$ where $|x| \ge 1, \quad -\frac{\pi}{2} \le y \le \frac{\pi}{2}, \quad y \ne 0$

$y = \cot^{-1} x$ if and only if $x = \cot y$ where $-\infty < x < \infty, \quad 0 < y < \pi$

$$\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta \qquad \cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$$

$$\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta \qquad \sin(\alpha - \beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$$

$$\tan(\alpha + \beta) = \frac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta} \qquad \tan(\alpha - \beta) = \frac{\tan\alpha - \tan\beta}{1 + \tan\alpha\tan\beta}$$

$$\sin(2\theta) = 2\sin\theta\cos\theta$$

$$\cos(2\theta) = \cos^2\theta - \sin^2\theta$$

$$\cos(2\theta) = 1 - 2\sin^2\theta$$

$$\cos(2\theta) = 2\cos^2\theta - 1$$

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

$$\sin\frac{\alpha}{2} = \pm\sqrt{\frac{1 - \cos\alpha}{2}}$$

$$\cos\frac{\alpha}{2} = \pm\sqrt{\frac{1 + \cos\alpha}{2}}$$

$$\tan\frac{\alpha}{2} = \pm\sqrt{\frac{1 - \cos\alpha}{1 + \cos\alpha}}$$

or

$$\tan\frac{\alpha}{2} = \frac{1 - \cos\alpha}{\sin\alpha} = \frac{\sin\alpha}{1 + \cos\alpha}$$