

Trig Identities for Test 3

Definitions

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$$

$$\cot \alpha = \frac{\cos \alpha}{\sin \alpha}$$

$$\sec \alpha = \frac{1}{\cos \alpha}$$

$$\csc \alpha = \frac{1}{\sin \alpha}$$

Pythagorean Identities

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$\tan^2 \alpha + 1 = \sec^2 \alpha$$

$$1 + \cot^2 \alpha = \csc^2 \alpha$$

Even/Odd Identities

$$\sin(-\alpha) = -\sin \alpha$$

$$\cos(-\alpha) = \cos \alpha$$

Addition/Subtraction Identities

$$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \cos \alpha \sin \beta$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \sin \alpha \sin \beta$$

Double-Angle Identities

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

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

$$= 2 \cos^2 \alpha - 1$$

$$= 1 - 2 \sin^2 \alpha$$

Half-Angle Identities

$$\sin\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 - \cos \alpha}{2}}$$

$$\cos\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$