

Trigonometric Formulas

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

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

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

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

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

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

$$\cos(u/2) = \pm \sqrt{\frac{1 + \cos u}{2}}$$

$$\sin(u/2) = \pm \sqrt{\frac{1 - \cos u}{2}}$$

$$\tan(u/2) = \frac{1 - \cos u}{\sin u} = \frac{\sin u}{1 + \cos u}$$

1. Find $\sin(2x)$, $\cos(2x)$, and $\tan(2x)$ if $\sec(x) = 5$ and $\sin(x) < 0$.

2. Find $\sin(2x)$, $\cos(2x)$, $\tan(2x)$, $\sin(x/2)$ and $\cos(x/2)$ if $\sin(x) = 1/6$; x is in quadrant 2.

3. Simplify:

a) $\cos^2(6\alpha) - \sin^2(6\alpha) =$

b) $2\cos(5\theta)\sin(5\theta) =$

c) $\frac{[2\tan(8\theta)]}{[1 - \tan^2(8\theta)]} =$

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

e) $\sqrt{\left(\frac{[1 + \cos(3\theta)]}{2}\right)} =$

f) $\frac{[\sin(40^\circ)]}{(1 + \cos(40^\circ))} =$