



Figure 2 The Unit Circle

**sum and difference formulas for cosine**

These formulas can be used to calculate the cosine of sums and differences of angles.

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

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

**sum and difference formulas for sine**

These formulas can be used to calculate the sines of sums and differences of angles.

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

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

**sum and difference formulas for tangent**

The sum and difference formulas for tangent are:

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

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

***cofunction identities***

The cofunction identities are summarized in **Table 2**.

$\sin \theta = \cos\left(\frac{\pi}{2} - \theta\right)$	$\cos \theta = \sin\left(\frac{\pi}{2} - \theta\right)$	$\tan \theta = \cot\left(\frac{\pi}{2} - \theta\right)$
$\sec \theta = \csc\left(\frac{\pi}{2} - \theta\right)$	$\csc \theta = \sec\left(\frac{\pi}{2} - \theta\right)$	$\cot \theta = \tan\left(\frac{\pi}{2} - \theta\right)$

**Table 2**