

Sum and Difference Formulas (5.2)**Sum and Difference Formulas**

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

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

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

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

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

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

Using the Sum or Difference Formulas (Forward): Use the sum or difference formulas to evaluate.

1) $\cos(135^\circ - 60^\circ)$

2) $\tan\left(\frac{\pi}{4} + \frac{2\pi}{3}\right)$

Using the Sum or Difference Formulas (Backwards): Find the exact value of each expression.

3) $\cos 70^\circ \cos 40^\circ + \sin 70^\circ \sin 40^\circ$

4) $\frac{\tan \frac{5\pi}{18} - \tan \frac{\pi}{36}}{1 + \tan \frac{5\pi}{18} \tan \frac{\pi}{36}}$

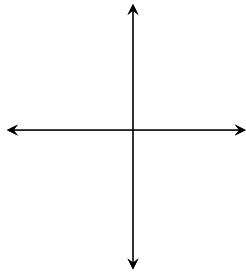
Finding the Exact Value: Find the exact value of each trigonometric function.

5) $\sin \frac{5\pi}{12}$

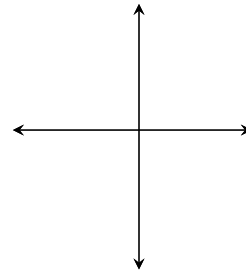
6) $\tan 75^\circ$

Using Sum and Difference:

Suppose that $\sin \alpha = \frac{4}{5}$ for a **quadrant I** angle α and $\cos \beta = \frac{1}{2}$ for a **quadrant I** angle β .



7) $\cos(\alpha + \beta)$



8) $\tan(\alpha + \beta)$

Verifying Identities Using the Sum or Difference Formulas: Verify the following identities.

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

10) $\tan\left(\frac{\pi}{4} - \theta\right) = \frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta}$