

## Sum and Difference Identities

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

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

$$\tan(\alpha \pm \beta) =$$

\*Leave answers in simplest radical or fractional form. NO DECIMAL ANSWERS!!

**Sum or Difference Identities.**

A. Find the exact value of each trig value by rewriting the angle as the sum or difference of 2 special angles.

1.  $\cos \frac{\pi}{12}$

2.  $\sin 105^\circ$

3.  $\tan 15^\circ$

B. Find the exact value of each expression by simplifying to a special angle.

4.  $\cos 40^\circ \cos 10^\circ + \sin 40^\circ \sin 10^\circ$

5.  $\sin \frac{\pi}{12} \cos \frac{7}{12} \pi - \cos \frac{\pi}{12} \sin \frac{7}{12} \pi$

6.  $\frac{\tan 40^\circ + \tan 20^\circ}{1 - \tan 40^\circ \tan 20^\circ}$

C. Given:  $\sin A = -\frac{3}{5}$ ,  $\pi < A < \frac{3}{2}\pi$  and  $\cos B = -\frac{12}{13}$ ,  $\frac{\pi}{2} < B < \pi$

Set up a triangle in the correct quadrant for angle A and angle B. Use the triangle to find each value.

Angle A

Angle B

7.  $\sin(A - B)$

8.  $\tan(A + B)$

Verify each identity. Use ONLY the Fundamental Identities. Show ALL Steps.

9.  $\cos\left(x - \frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2}(\cos x + \sin x)$

10.  $\frac{\sin(\alpha + \beta)}{\cos \alpha \cos \beta} = \tan \alpha + \tan \beta$

11.  $3\sin^2 \theta + 4\cos^2 \theta = 3 + \cos^2 \theta$

12.  $\frac{\sec x}{\csc x} + \frac{\sin x}{\cos x} = 2 \tan x$