

### 5.3 Sum & Difference Identities

#### ESSENTIAL QUESTION:

How are sum and difference identities used to find trig functions of odd-ball angles (like  $\sin 75^\circ$ )?

#### SUM AND DIFFERENCE IDENTITIES

$$\cos(u \pm v) = \cos(u)\cos(v) \mp \sin(u)\sin(v)$$

$$\sin(u \pm v) = \sin(u)\cos(v) \pm \cos(u)\sin(v)$$

$$\tan(u \pm v) = \frac{\tan(u) \pm \tan(v)}{1 \mp \tan(u)\tan(v)}$$

examples...

Use a sum or difference identity to find an exact value:

1.  $\cos 75^\circ$

2.  $\sin \frac{\pi}{12}$

3.  $\tan \frac{11\pi}{12}$

Write each expression in terms of a single angle.

4.  $\cos 94^\circ \cos 18^\circ + \sin 94^\circ \sin 18^\circ$

5.  $\sin \frac{\pi}{7} \cos \frac{\pi}{3} - \cos \frac{\pi}{7} \sin \frac{\pi}{3}$

Use sum or difference identities to verify the identity.

6.  $\sin\left(\frac{\pi}{2} - \theta\right) = \cos \theta$

7.  $\cos\left[\left(\frac{\pi}{2} - x\right) - y\right] = \sin(x + y)$