

**6.3 Sum and Differences Identities**

1. Find the exact value of each expression.
  - (a)  $\cos\left(\frac{5}{12}\pi\right)$
  - (b)  $\sin\left(\frac{\pi}{12}\right)$
  - (c)  $\sin\left(\frac{7\pi}{12}\right)$
  - (d)  $\sin 15^\circ$
  - (e)  $\cos 105^\circ$
2. Write each expression as a single function of  $\theta$ .
  - (a)  $\cos\left(\frac{\pi}{6} + \theta\right)$
  - (b)  $\cos\left(\frac{\pi}{4} - \theta\right)$
  - (c)  $\sin\left(\frac{\pi}{3} + \theta\right)$
3. Use the cofunction identities to find an angle  $\theta$  that satisfies each of the following.
  - (a)  $\cot \theta = \tan \frac{\pi}{6}$
  - (b)  $\cos \theta = \sin \frac{\pi}{4}$
  - (c)  $\cos \theta = \sin 25^\circ$
4. Suppose that  $\sin \alpha = \frac{7}{25}$  and  $\sin \beta = -\frac{8}{17}$ , with  $\alpha$  in quadrant II and  $\beta$  in quadrant III.
  - (a) Find the exact value of  $\sin(\alpha + \beta)$
  - (b) Find the exact value of  $\cos(\alpha + \beta)$
  - (c) In which quadrant does the angle  $\alpha + \beta$  lie?
5. Suppose that  $\sin \alpha = -\frac{4}{5}$  and  $\cos \beta = \frac{12}{13}$ , with  $\alpha$  in quadrant III, and  $\beta$  in quadrant IV.
  - (a) Find the exact value of  $\sin(\alpha + \beta)$
  - (b) Find the exact value of  $\cos(\alpha + \beta)$
  - (c) In which quadrant does the angle  $\alpha + \beta$  lie?