1. Suppose $\cot \theta > 0$ and $\cos \theta < 0$, which quadrant must $\theta$ be in?

2. Suppose $\sec \theta = -\frac{13}{12}$ and $\csc \theta < 0$. Determine the value of all six trig functions of $\theta$.

3. Simplify $\sec(-\theta) \cot(-\theta) \sin(-\theta)$.

4. Verify each identity
   
   (a) $\cos \theta + \sin \theta)^2 + (\cos \theta - \sin \theta)^2 = 2$

   (b) $\sec(2x) = \frac{1}{2\cos^2 x - 1}$
5. Suppose $\theta$ is in quadrant 2 and $\theta_R = \frac{\pi}{3}$. Determine $\theta$.

6. Find all solutions in the interval $[0^\circ, 360^\circ)$.
   
   (a) $\tan \theta = \sqrt{3}$

   (b) $\sin \theta = 1$

7. Find all solutions to $2 \sin^2 t - \sin t - 1 = 0$.

8. Determine $\sin \frac{\pi}{12}$ exactly using a half angle identity.

9. Determine $\sin \frac{\pi}{12}$ exactly using a difference identity.
10. Simplify \( \sin(2 \sin^{-1} x) \), where \( x > 0 \).

11. Suppose \( \cos \alpha = \frac{3}{5} \) and \( \cos \beta = \frac{12}{13} \) and both \( \alpha \) and \( \beta \) are in quadrant 1. Determine the following:
   
   (a) \( \sin(\alpha + \beta) \)

   (b) \( \cos(\alpha + \beta) \)

   (c) \( \tan(\alpha + \beta) \)

   (d) The quadrant containing \( \alpha + \beta \)

   (e) \( \sin(2\alpha) \)

   (f) \( \cos(2\alpha) \)

   (g) \( \tan(2\alpha) \)

   (h) The quadrant containing \( 2\alpha \)