1. Solve the following triangle: \( a = 9, b = 7, c = 4 \)

2. A man goes for a jog. He starts out from his house going N 85° W for 3 miles. He then changes to a direction of N 12° W and jogs in this direction for 5 miles.
   (a) How far from his house is he at this point?
   (b) What bearing should he head in to get back to his house?

3. Simplify the following expression completely: \( \frac{\sec u - \tan u}{\csc u + 1} \)

4. Substitute \( x = 4 \sin \theta \) into the expression \( \frac{x^2}{\sqrt{16 - x^2}} \) and simplify. (Assume that \( \theta \) is in Quadrant I.)

5. Use Addition or Subtraction Formulas to evaluate the following.
   (a) \( \cos 165° \)
   (b) \( \sin(-\frac{5\pi}{12}) \)
   (c) \( \left( \frac{\tan 62° - \tan 17°}{1 + \tan 62° \tan 17°} \right) (\cos 39° \cos 21° - \sin 39° \sin 21°) \)

6. Given that \( \csc x = \frac{3}{2} \) and that \( x \) is in Quadrant II, find \( \sin 2x, \cos 2x, \) and \( \tan 2x \).

7. Use a Half-Angle Formula to evaluate \( \sin 75° \).

8. Given that \( \tan x = \frac{5}{2} \) and that \( 180° < x < 270° \), find \( \sin \frac{x}{2}, \cos \frac{x}{2}, \) and \( \tan \frac{x}{2} \).

9. Use a Sum-to-Product Formula to evaluate \( \cos 105° + \cos 15° \).

10. Use a Product-to-Sum Formula to evaluate \( \sin 172.5° \sin 52.5° \).

11. Verify (prove) the following identities.
   (a) \( \frac{1 + \sec x}{\tan x} - \frac{\tan x}{1 + \sec x} = 2 \cot x \)
   (b) \( \frac{\cot(-t) + \tan(-t)}{\tan(\frac{\pi}{2} - t)} = -\sec^2 t \)
   (c) \( \tan \left( \frac{\pi}{2} - u \right) = \cot u \)
   (d) \( \frac{2(\tan x - \cot x)}{\tan^2 x - \cot^2 x} = \sin 2x \)
   (e) \( \sin^2 3x \cos^2 3x = \frac{1}{8}(1 - \cos 12x) \)
   (f) \( \cos 4\theta = 8 \cos^4 \theta - 8 \cos^2 \theta + 1 \)
   (g) \( \frac{\sin 12x}{\sin 11x + \sin x} = \frac{\cos 6x}{\cos 5x} \)

   Not all instructors may have covered the following two questions.

12. Find the area of the triangle with \( a = 5, b = 10, c = 7 \).

13. Write the following in terms of sine only. \(-2 \sin x - 2\sqrt{3} \cos x\)