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: \[
\frac{(\sec u - \tan u)(\csc u + 1)}{\csc u}
\]

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) \( \cos 165^\circ \)
(b) \( \sin\left(-\frac{5\pi}{12}\right) \)

(c) \( \left( \frac{\tan 62^\circ - \tan 17^\circ}{1 + \tan 62^\circ \tan 17^\circ} \right) \left( \cos 39^\circ \cos 21^\circ - \sin 39^\circ \sin 21^\circ \right) \)

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 \( \sin 75^\circ \).

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

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

10. Use a Product-to-Sum Formula to evaluate \( \sin 172.5^\circ \sin 52.5^\circ \).
11. Verify (prove) the following identities.

(a) \[ \frac{1 + \sec x}{\tan x} - \frac{\tan x}{1 + \sec x} = 2 \cot x \]

(b) \[ \frac{\cot(-t) + \tan(-t)}{\tan\left(\frac{\pi}{2} - t\right)} = -\sec^2 t \]

(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) \[ \cos 4\theta = 8 \cos^4 \theta - 8 \cos^2 \theta + 1 \]
\[
\text{(g) } \frac{\sin 12x}{\sin 11x + \sin x} = \frac{\cos 6x}{\cos 5x}
\]

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. \(-2\sin x - 2\sqrt{3}\cos x\)