Math 165-01 Review 2

Directions: Show your work, organize, and write clearly.

1. Evaluate the trigonometric expressions.
   a) \( \cos(15^\circ) \)
   b) \( \sin(105^\circ) \)

2. Plot the points \( A(2,1) \) and \( B(6,1) \). Then plot point \( C \) which lies above the line segment \( \overline{AB} \), and that makes angles \( \angle ABC = 75^\circ \) and \( \angle BAC = 60^\circ \).
   a) Determine the distance \( BC \).
   b) Find an equation of the line containing \( A \) and \( C \).
   c) Determine the perpendicular distance from \( C \) to the line segment \( \overline{AB} \).

3. Determine the center and radius of the circle \( x^2 + y^2 - \frac{4}{3}x + \frac{3}{2}y + \frac{43}{48} = 0 \)

4. Let \( f(x) = 2x^2 - x + 5 \)
   a) Evaluate \( \frac{f(x + \Delta x) - f(x)}{\Delta x} \)
   b) Solve \( f(x) = 26 \).
   c) Solve the equation \( f(\sin(x)) = 5 \) for all solutions in the interval \( 0 \leq x < 2\pi \).

5. Evaluate the trigonometric expressions.
   a) \( \sin\left(\frac{\pi}{6}\right) \cos\left(\frac{\pi}{12}\right) + \cos\left(\frac{\pi}{6}\right) \sin\left(\frac{\pi}{12}\right) \)
   b) \( \cos\left(\frac{11\pi}{12}\right) \cos\left(\frac{\pi}{4}\right) + \sin\left(\frac{11\pi}{12}\right) \sin\left(\frac{\pi}{4}\right) \)

6. Solve the equation for all solutions in the interval \( 0 \leq \theta < 2\pi \).
   a) \( \csc^2(\theta) - \csc(\theta) = 2 \)
   b) \( 2\sin^2(\theta) = \cos(\theta) + 1 \)
   c) \( \tan^2(\theta) - \sec(\theta) - 1 = 0 \)

7. Find the slope-intercept form of the line that passes through the pair of points.
   a) \( \left(\frac{2}{3}, \frac{1}{3}\right) \) and \( \left(\frac{3}{4}, \frac{1}{2}\right) \)
   b) \( (\cos 0, \sin 0) \) and \( (\cos \frac{\pi}{3}, \sin \frac{\pi}{3}) \)