1. Determine the value of the indicated variable if the point lies in the unit circle.
   (a) \((\frac{2}{3}, \frac{a}{3})\)
   (b) \((\frac{b-2}{2}, \frac{b+1}{4})\)

2. Solve for \(x\) in the interval \(0 \leq x < 2\pi\).
   (a) \(1 + \sin(x) - 2\cos^2(x) = 0\)
   (b) \(\cot^2(x) - \csc(x) = 1\)
   (c) \(\tan^2(x) - \sec(x) - 1 = 0\)
   (d) \(\sin^2(x) = 2\)
   (e) \(\log_3(2\sin x) = \frac{1}{2}\)
   (f) \(\log_3(\sqrt{3}\tan x) = 0\)
   (g) \(\log_2(\sin(x)) - \log_2(\tan(x)) = -1\)
   (h) \(\log_8(\tan(x)) + \log_8(\csc(x)) = \frac{1}{3}\)

3. Solve the system of equations.
   (a) \[
   \begin{align*}
   x^2 + y &= 5 \\
   y - x &= 3
   \end{align*}
   \]
   (b) \[
   \begin{align*}
   x^2 + y^2 &= 25 \\
   x - y &= -1
   \end{align*}
   \]

4. Sketch a right triangle corresponding to the acute angle \(\theta\) satisfying \(\tan(\theta) = 2\sqrt{2}\).
   a) Determine the length of the remaining side of the triangle.
   b) Evaluate \(\sec(\theta)\) and \(\csc(\theta)\).

5. Evaluate the trigonometric expressions.
   (a) \(\cos(15^\circ)\)
   (b) \(\tan\left(\frac{7\pi}{12}\right)\)

6. Plot the points \(A(1, 1)\) and \(B(5, 1)\). A point \(C\) in the first quadrant makes the angles \(\angle ABC = 75^\circ\) and \(\angle BAC = 60^\circ\).
   a) Determine the distance \(AC\).
   b) Find an equation of the line containing \(A\) and \(C\).
   c) Determine the perpendicular distance from \(C\) to the line segment \(AB\).
   d) Determine the \(y\)-coordinate of point \(C\).
   e) Determine the area of triangle \(\triangle ABC\).

7. Determine the slope-intercept form of the line that contains the points \((\cos 0, \sin 0)\) and \((\cos \frac{\pi}{4}, \sin \frac{\pi}{4})\)

8. 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 \(0 \leq x < 2\pi\).
9. Evaluate \( \cos(A + B) \), and \( \tan(A - B) \) from given the information: \( \sec(A) = \frac{13}{12} \), \( \tan(B) = \frac{4}{3} \), \( \frac{\pi}{2} < A < 2\pi \), and \( \pi < B < \frac{3\pi}{2} \).

10. Determine the center and radius of the circle \( x^2 + \frac{2}{3}x + y^2 - 4y = -\frac{10}{9} \).

11. Solve the equation.
   (a) \( \log_3(5x - \frac{26}{3}) = -2 \)
   (b) \( \log(3x - \frac{9}{2}) = 1 \)
   (c) \( \ln(\frac{x}{2} + \frac{3}{2}) = 1 \)
   (d) \( 3^{2x^2+x-4} = \frac{1}{27} \)
   (e) \( 3x^2 - 2 = 12 \)

12. Evaluate the trigonometric expression \( \cos(\arccos(-\frac{\sqrt{3}}{2}) - \arcsin(-\frac{\sqrt{2}}{2})) \).

13. Evaluate \( \tan(2B) \) from the given expression: \( \sin(B) = \frac{5}{13} \) and \( \frac{\pi}{2} < B < \pi \).

14. Apply long division to simplify \( \frac{4x^3 + 11x^2 + 5x - 2}{4x - 1} \).
   Then solve \( 4x^3 + 11x^2 + 5x - 2 = 0 \).

15. Verify the identity.
   (a) \( \tan(x) + \cot(x) = \csc(x) \sec(x) \)
   (b) \( \sec^2(x) - 2 \tan^2(x) = 2 - \sec^2(x) \)

16. Determine the \( x \)-intercepts, and the coordinates of the vertex of the parabola defined by \( f(x) = x^2 - 4x + 3 \). Include a sketch of the parabola. Then consider the triangle that is formed by the \( x \)-intercepts and the vertex of the parabola. What are the angles of the triangle?

17. Sketch the graph of the function. Draw one cycle, determine the amplitude, and the period.
   Label the \( x \)-axis with the values corresponding to the maximum points, minimum points, and the \( x \)-intercepts.
   (a) \( y = 2 \sin(x) \)
   (b) \( y = 3 \cos(\pi x) \)