1. Find the equation of the tangent line to the curve \( f(x) = \sin(\cos(\tan(x))) \) at \( x = \pi/4 \). Use at least 7 decimal places in your answers.

**Solution:** The exact solution is

\[-2 \cos(\cos(1)) \sin(1) \left(x - \frac{\pi}{4}\right) + \sin(\cos(1))\]

and if you approximate it you get \( y = -1.443212298x + 1.647891547 \).

2. Find all of the points on the curve \( y(y + 1)(y - 2) = x^3(x - 1)(x - 2) \) where the tangent line to the curve has slope 1. Use at least 7 decimal places in your answers.

**Solution:** The points are \((1.917962100, 1.903897542), (-0.5685469657, 1.860925122), (1.897625597, -1.169421046)\) and \((-0.5684528655, -1.194031220)\).

3. Find all of the common tangent lines to the curves

\( f(x) = x^2 - 3x + 3 \) and \( g(x) = -2x^2 + 4x - 5 \)

**Solution:** The \( x \) values for the points of tangency on the \( g(x) \) function are \( \frac{7}{6} - \frac{\sqrt{94}}{12} \) and \( \frac{7}{6} + \frac{\sqrt{94}}{12} \).

The exact equations of the tangent lines are

\[ \left(\frac{2}{3} + \frac{\sqrt{94}}{3}\right) \left(x - \frac{7}{6} + \frac{\sqrt{94}}{12}\right) - 2 \left(\frac{7}{6} - \frac{\sqrt{94}}{12}\right)^2 - \frac{1}{3} \frac{\sqrt{94}}{3} = \left(\frac{2}{3} + \frac{\sqrt{94}}{3}\right) x - \frac{35}{36} - \frac{7\sqrt{94}}{18} \]

and

\[ \left(\frac{2}{3} - \frac{\sqrt{94}}{3}\right) \left(x - \frac{7}{6} - \frac{\sqrt{94}}{12}\right) - 2 \left(\frac{7}{6} + \frac{\sqrt{94}}{12}\right)^2 - \frac{1}{3} \frac{\sqrt{94}}{3} = \left(\frac{2}{3} - \frac{\sqrt{94}}{3}\right) x - \frac{35}{36} + \frac{7\sqrt{94}}{18} \]

Approximating these gives the lines \( y = -3.898453238x + 2.798195446 \) and \( y = 2.565119904x - 4.742639886 \).