1. Consider the four data points: $(-1, 1), (0, 1), (1, 2), (2, 0)$.
   (a) What degree polynomial is required to interpolate it?
   (b) Determine (by hand) the unique interpolating polynomial using all three methods, and show that they result in the same polynomial.
2. We know the values of $\sin(x)$ on the interval $[0, \pi/2]$ at $x = 0, \pi/6, \pi/4, \pi/3, \pi/2$, which are respectively $y = 0, 1/2, \sqrt{2}/2, \sqrt{3}/2, 1$. Derive an interpolating polynomial. What is the error at $x = 1$?
3. Find f given $f(0) = 0$, $f(1) = 2$, and $f[x_0, x_1, x_2] = 1$ for any three points x_0, x_1, x_2.
4. Suppose we wish to interpolate $n + 1$ data points with a piecewise quadratic polynomial. How many continuous derivatives can this interpolant have without becoming one global polynomial?