Pre Calculus **11 - Differentiability** **Name:**

1. Determine whether the functions below are (D)ifferentiable, (C)ontinuous but non-differentiable, (N)either. Sketch each function.

a) $f(x) = |x - 2|$

b) $f(x) = \sqrt[3]{x}$

c) $f(x) = \begin{cases} x^2, & x \le 1 \\ 2x, & x > 1 \end{cases}$

d) $f(x) = x^{9/5}$

e) $f(x) = x^{4/5}$

2. Use analytic methods to find and identify extrema and points of inflection. Organize information in a sign chart and then sketch. Check your work with your calculator.

a) $f(x) = x^4 + 8x^3 + 18x^2$

b) $g(x) = 2x^4 - 4x^2 + 3$

3. Find the equation of the best quadratic approximation of ln(x) at x=1. The best quadratic approximation will have the same first and second derivatives at x=1