Instructions. Put the first and last name of everyone in your workgroup at the top of your paper. Everyone is to do their own worksheet but only one from each group is graded with the score shared. Be sure to show your work and explain your reasoning.

1. (a) If $f$ is a differentiable function, what is the equation of the tangent line to the graph of $f$ at some point $a$?
   
   (b) Determine the $x$-intercept of the tangent line to the graph of $f$ at the point $a$.
   
   (c) Explain why your solution to the previous problem looks a great deal like Newton’s formula for approximating roots.

2. For which initial values in $[-1, 3]$ do you suspect Newton’s method will be successful in approximating the root of the function graphed. Explain why the method is likely to fail at the other values.

3. If $f''(x) = \sin x$ and $f'(0) = 1$ and $f(0) = 2$, determine $f$.

4. If $f''(x) = \sqrt{x}$ and $f'(1) = 2$ and $f(1) = 1$ determine $f$. 