**Math 16, Homework 9**

1. Use Newton's method to find the cube root of 17 to 3 digits accuracy.
2. Use Newton's method to solve the equation $e^x = x^2$ to 3 digits accuracy.
3. Graph the function $y = f(x) = x^4 - 7x^3 + 5x^2 + 2x - 13$, using first and second derivative information to find the intervals on which the function is increasing/decreasing and concave up/down. (You will need to find the local maxima and minima of $f'(x)$ in order to obtain initial guesses for the zeroes of $f'(x)$. Then use Newton's method to find the zeroes of $f'(x)$ precisely.
4. Graph the function $y = f(x) = e^x(x^3 + 5x - 16)$. using first and second derivative information to find the intervals on which the function is increasing/decreasing and concave up/down.
5. Find the tangent line to $y = f(x) = e^x(x^3 + 5x - 16)$ at $x = 1$.
6. Find a point $(a, f(a))$ on the graph of $y = f(x) = e^x(x^3 + 5x - 16)$ such that the tangent line to the graph at $(a, f(a))$ passes thru the point $(3, 0)$. (There are two such points! Remember that Newton's method is a general equation solving method!)
7. Find the two points on the circle $x^2 + y^2 = 1$ such that the tangent line to the circle at those points passes thru the point $(5, 0)$.