

Math 229 Section 10 Extra Credit

Name:

1. Let

$$f(x) = \begin{cases} x^2 \sin(1/x) & \text{if } x \neq 0, \\ 0 & \text{if } x = 0. \end{cases}$$

Give a limit that is slope of the tangent line to $y = f(x)$ at $x = 0$.

2. Evaluate the limit in #1 to find the slope of the tangent line.

3. Find an equation for the tangent line to $y = f(x)$ at $x = 0$.

4. Does this tangent line cross the graph of $y = f(x)$? At what values of x ?

5. Someone says “Unless the graph is just a line, if you look at a small enough interval around $x = a$, eventually you’ll see that the tangent line hits the graph only at the point $x = a$.” Do you believe them? Explain.