Problem 1. *List all the differentiation rules that we have so far.*

Problem 2. *Compute the derivative of $f(x) = \sqrt{x^2 + \cos(x)}$. Use only one rule in each step, and state which rule you're using.*

Problem 3. *Show that the function* $y = e^{2x}(A\cos(3x) + B\sin(3x))$ *satisfies the differential equation* $y'' - 4y' + 13y = 0$.

Problem 4. *Find the 50th derivative of* $y = \cos(2x)$.

Problem 5. *Let* $COS(x)$ *be the cosine function using degrees. What is the second derivative of* $COS(x)$*?*