Section 3.4
1. Use the definition of the derivative to find the derivative of \( f(x) = \sin 2x \)

2. Assuming the derivatives of \( \sin x \) and \( \cos x \), prove \( \frac{d}{dx}(\tan x) = \sec^2 x \).

3. Given \( \lim_{x \to 0} \sin x = 0 \) and \( \lim_{x \to 0} \cos x = 1 \), prove that \( f(x) = \sin x \) is continuous for all \( x \).

Section 3.5
4. Prove that the derivative of an even function is an odd function.

5. Prove: if \((x-a)^2\) is a factor of a polynomial function \( p(x) \), then \( x-a \) is a factor of \( p'(x) \).

Section 3.6
6. Differentiate the equation \( \frac{y-a}{x-b} = c \) implicitly to find \( y' \). Explain the significance of your answer.

7. Prove the power rule works for rational exponents (i.e., prove that if \( n = \frac{p}{q} \), then \( \frac{d}{dx}(x^n) = nx^{n-1} \)).