

MA161 SEMESTER 1, CALCULUS: PROBLEM SHEET 8

1. Let $f(x) = 7 - 13x$. Use the definition of the derivative to find $f'(-2)$. What is the derivative f' as a function of x ?

2. Use the definition of the derivative to show that the derivative of $f(x) = x^2 - 4$ is $f'(x) = 2x$.

3. Let $f(x) = x^3$. Use the definition of the derivative to show that $f'(x) = 3x^2$.

4. Differentiate the following functions
 - (a) $f(x) = 4x^3 + e^{4x}$
 - (b) $f(x) = x^2 \sin(3x)$
 - (c) $f(x) = \frac{\cos(x)}{x^3}$
 - (d) $f(x) = \sqrt[3]{x^2 + 2x + 1}$
 - (e) $f(x) = \frac{(x^2 + 1)^6}{x + 2}$
 - (f) $f(x) = \sin^3(x) \cos^2(x)$
 - (g) $f(x) = \sin(2x^2)$
 - (h) $f(x) = \sin^2(2x)$