

Name

MUN Number

1. Differentiate each of the following functions. Make any obvious simplifications.

[5] (a) $y = x^3 \sin(\cot(x))$

[5] (b) $y = \sin^3(\cot(x))$

[5] (c) $y = \sin(x^3 \cot(x))$

[5] (d) $f(x) = x^2 \ln(x) \tan(x)$

[5] (e) $f(x) = \frac{e^{5x} - 1}{e^{5x} + 1}$

[5] (f) $y = x^{\sqrt{x}}$

[5] 2. Find $\frac{dy}{dx}$ given that $x^4 \cos(y) = \sec(2x) - 8y$.

[5] 3. Use the limit definition of the derivative to prove the Difference Rule:

$$[f(x) - g(x)]' = f'(x) - g'(x).$$