

# MAT 136 (Calculus I), Quiz 4, Prof. Jim Swift

No notes, no calculators allowed. Do your own work.

Name: key

Differentiate the following functions. Use a complete sentence for each answer. You do *not* need to simplify unless instructed to do so.

1.  $f(x) = 3x^2 - 5x + 6$

$$f'(x) = 3 \cdot 2x - 5 \cdot 1 + 0 = \boxed{6x - 5} \quad \text{OK to go straight to answer.}$$

2.  $g(x) = \frac{1}{x^2} - 4\sqrt{x} = x^{-2} - 4x^{\frac{1}{2}}$

$$g'(x) = -2x^{-3} - 4\left(\frac{1}{2}\right)x^{\frac{1}{2}-1} = \boxed{-2x^{-3} - 2x^{-\frac{1}{2}}}$$

3.  $y = x(e^x - x^2)$

$$\frac{dy}{dx} \text{ or } y' = \boxed{1 \cdot (e^x - x^2) + x(e^x - 2x)} \quad \text{No need to simplify}$$

4.  $h(x) = \frac{x}{x^2 + 2}$ . Simplify the derivative.

$$h'(x) = \frac{1 \cdot (x^2 + 2) - x(2x + 0)}{(x^2 + 2)^2} = \frac{x^2 + 2 - 2x^2}{(x^2 + 2)^2} = \boxed{\frac{-x^2 + 2}{(x^2 + 2)^2}}$$