

**Section 3.1: Derivatives of Polynomials and Exponential Functions**

- (1) In this section, we learn several differentiation rules. These all come from the limit definition of derivative, but you should also memorize them. Fill in the derivative rules below:

Rule	Example	Notes
$\frac{d}{dx}(c) =$	$\frac{d}{dx}(3) =$	where $c$ is any constant
$\frac{d}{dx}(x) =$	$\frac{d}{dx}(x) =$	
$\frac{d}{dx}(x^n) =$	$\frac{d}{dx}(x^5) =$	where $n$ is any real number (Power Rule)
$\frac{d}{dx}(cf(x)) =$	$\frac{d}{dx}(3x^2) =$	where $c$ is any constant (Constant Multiple Rule)
$\frac{d}{dx}(f(x) + g(x)) =$	$\frac{d}{dx}(x^3 + 3x) =$	(The Sum Rule)
$\frac{d}{dx}(f(x) - g(x)) =$	$\frac{d}{dx}(x - 3x^2 - 4) =$	(The Difference Rule)
$\frac{d}{dx}(e^x) =$	$\frac{d}{dx}(4e^x) =$	

- (2) Explain the difference between the first rule and the Constant Multiple rule. When would you use each one?

- (3) How would you simplify  $\frac{2xe^x + \sqrt{6x} + 2x^5}{x}$  so that we could find the derivative using the above rules?

Extra Practice in Book: 3.1: Derivative Rules (3-32) until comfortable with all rules. 35, 45, 49, 57, 65