

## Math 131 - February 12, 2015

### Warm-up Problems

1. Algebraically expand the following:

(a)  $(x + h)^2 =$

(b)  $(x + h)^3 =$

(c)  $(x + h)^4 =$

(d)  $(x + h)^5 =$

2. Using the limit definition of derivative, find  $f'(x)$ .

(a)  $f(x) = 4$ .  $f'(x) =$

(b)  $f(x) = \pi$ .  $f'(x) =$

(c)  $f(x) = 4x$ .  $f'(x) =$

(d)  $f(x) = -12x$ .  $f'(x) =$

3. Using the limit definition of derivative, find  $f'(x)$ .

(a)  $f(x) = 3x^2 - 2x$ .  $f'(x) =$

(b)  $f(x) = \frac{1}{x^2}$ .  $f'(x) =$

### Lecture Problems

4. Find the following derivatives

(a)  $\frac{d}{dx} (849x^{102}) =$

(b)  $\frac{d}{dx} (4x^3 - 12x + 1) =$

(c)  $\frac{d}{dx} \left( \frac{1}{x^6} - \sqrt{x} \right) =$

(d)  $\frac{d}{dx} \left( \frac{4x^2}{\sqrt{x}} + 4x \right) =$

(e)  $\frac{d}{dx} \left( \frac{4x^2 + 2x - 1}{x^3} \right) =$

(f)  $\frac{d}{dx} \left( \frac{4x^2 + 2x - 1}{\sqrt{x}} \right) =$

(g)  $\frac{d}{dx} \left( \frac{4x^2 + 2x - 1}{x - 3} \right) =$

(h)  $\frac{d}{dx} \left( \frac{4x^2 + 2x - 1}{x^2 + 2} \right) =$

5. Find the following derivatives

(a)  $\frac{d}{dx} (4e^x + 2x) =$

(b)  $\frac{d}{dx} (13x^2 + 5e^x) =$

(c)  $\frac{d}{dx} (12xe^x) =$

(d)  $\frac{d}{dx} (12e^{2x} - 4x) =$