

MATH 210: 9-18 WORKSHEET

ATOMIC RULES

$$\frac{d}{dx} x^\alpha = \alpha x^{\alpha-1}$$

$$\frac{d}{dx} e^x = e^x$$

$$\frac{d}{dx} \sin x = \cos x$$

$$\frac{d}{dx} \cos x = -\sin x$$

COMBINATION RULES

$$\frac{d}{dx} c \cdot f(x) = c \cdot f'(x)$$

$$\frac{d}{dx} (f(x) + g(x)) = f'(x) + g'(x)$$

$$\frac{d}{dx} (f(x) - g(x)) = f'(x) - g'(x)$$

Differentiate the following functions:

- $a(x) = 9001$
- $b(x) = x^7 - 4x^5 + 3x^4 - x^2 + 10x - 8$
- $c(x) = e^x - x^e$
- $d(x) = 6\sqrt[3]{x}$
- $f(x) = \frac{1}{x} - \frac{3}{x^3}$
- $g(x) = \frac{2}{\sqrt{x^5}} - e^2 \cdot e^x$
- $h(x) = 2 - \sin x$
- $i(x) = \pi \cos x + \frac{x}{\pi}$
- $j(x) = \cos x + \sin x + 3ex^2$

Using your previous work, determine the derivatives at specific inputs:

- $b'(1)$
- $c'(0)$
- $f'(3)$
- $h'(\pi/3)$
- $j'(0)$