

## MATH 215 WORKSHEET #4

(1) Using the formulas, find the following derivatives:

(a)  $f(x) = 5x^2 - x + 2$

(b)  $g(x) = x + \frac{1}{x}$

(c)  $k(x) = \sin x + 2\sqrt{x}$

(d)  $f(t) = 2 + \frac{1}{2}t^5$

(e)  $w = t^3 + 2t - 4$

(f)  $u = 4e^s + \frac{1}{s^2}$

(2) Using the definition of the derivative at  $x = c$ , compute the following derivatives at an arbitrary point.

(a)  $f(x) = 7x^4$ .

(b)  $k(x) = \sqrt{x}$ .

(3) Compute the derivative at  $x = 0$ .

$$(a) r(x) = \begin{cases} \sin \frac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

$$(b) r(x) = \begin{cases} x \sin \frac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

$$(c) s(x) = \begin{cases} x^2 \sin \frac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

(4) Find the tangent line to  $y = x^4 + x^2 + 1$  at  $x = 1$ .

(5) Find the tangent line to  $y = \frac{1}{x}$  at  $x = 2$ .