Today's Plan:

Learning Target (standard): I will find use the definition of derivative to calculate a rate of change. I will explain the definition of derivative in terms of tangent lines and velocity.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make neccessary corrections to their own work, and take a quiz over rates of change.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuarcy and provide students feedback, describe and provide quiz problems.

Assessment: Board work, homework check and quiz

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in an assessment.

Find the derivative and state 2 interpretations:

$$f(x) = \frac{1}{x+5}$$

$$f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$$

$$= \lim_{h\to 0} \frac{\left[\frac{1}{x+h+5}\right] - \left[\frac{1}{x+5}\right]}{h}$$

$$= \lim_{h\to 0} \frac{\frac{x+5-(x+h+5)}{(x+5)(x+h+5)}}{h}$$

$$= \lim_{h\to 0} \frac{\cancel{x}+\cancel{5}-\cancel{x}-\cancel{h}-\cancel{5}}{(x+5)(x+h+5)} \cdot \frac{1}{\cancel{h}}$$

$$= \lim_{h\to 0} \frac{-1}{(x+5)(x+h+5)}$$

$$= \frac{-1}{(x+5)(x+0+5)}$$

$$f'(x) = \frac{-1}{(x+5)^2}$$

$\therefore$ Since $f(x) = \frac{1}{x+5}$ and $f'(x) = \frac{-1}{(x+5)^2}$, the slope of a tangent line thru $(x, f(x))$ to $f(x) = \frac{1}{x+5}$ is $\frac{-1}{(x+5)^2}$. The velocity of a particle moving along $f(x) = \frac{1}{x+5}$ @ a time of "x" is $\frac{-1}{(x+5)^2}$.

Assignment:

Use the definition of derivative to complete p.104 #1-8

1) $f(x) = 10x^2 + 9x - 4$

2) $f(x) = 6x^3 - 5x^2 + x + 9$

3) $f(s) = 15 - s + 4s^2 - 5s^4$

4) $f(t) = 12 - 3t^4 + 4t^6$

5) $g(x) = \left(x^3 - 7\right)\left(2x^2 + 3\right)$

6) $k(x) = \left(2x^2 - 4x + 1\right)\left(6x - 5\right)$

7) $h(r) = r^2\left(3r^4 - 7r + 2\right)$

8) $g(s) = \left(s^3 - 5s + 9\right)\left(2s + 1\right)$