Definition of Derivative

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

39. $f(x) = 6 - 5x$

$$\lim_{\Delta x \to 0} \frac{6 - 5(x+\Delta x) - (6 - 5x)}{\Delta x}$$

$$\lim_{\Delta x \to 0} \frac{\cancel{6} - \cancel{5x} - 5\Delta x \cancel{- 6} \cancel{+ 5x}}{\Delta x}$$

$$\lim_{\Delta x \to 0} \frac{-5\cancel{\Delta x}}{\cancel{\Delta x}}$$

$$\lim_{\Delta x \to 0} -5 = \boxed{-5}$$

42) $f(x) = 3x^2 - 8$ $(-2, 4)$

$f'(x) = 6x$

$m = 6(-2) = -12$

45. $f(x) = \sqrt{x-11}$ $(20, 3)$

$f(x) = (x-11)^{1/2}$

$f'(x) = \frac{1}{2}(x-11)^{-1/2}$

Find EQ of tangent line

$m = \frac{1}{2}(20-11)^{-1/2}$

$m = \frac{1}{2}(9)^{-1/2} = \frac{1}{2} \cdot \frac{1}{3} = \frac{1}{6}$

$y = mx + b$

$3 = \frac{1}{6}(20) + b$

$3 = \frac{10}{3} + b$

$b = -\frac{1}{3}$