Selected Problems 10.3

11. $f(x) = (x-3)(2x-1)$

$f'(x) = 1(2x-1) + (x-3)(2)$

$\qquad = 2x - 1 + 2x - 6$

$\qquad = 4x - 7$

$F = x - 3$

$F' = 1$

$S = 2x - 1$

$S' = 2$

31. $f(x) = \dfrac{e^x}{x^2+1}$

Quotient Rule

$f'(x) = \dfrac{e^x(x^2+1) - e^x(2x)}{(x^2+1)^2}$

$P = e^x$

$P' = e^x$

$Q = x^2 + 1$

$Q' = 2x$

$\qquad = \dfrac{e^x(x^2 - 2x + 1)}{(x^2+1)^2}$

$\qquad = \dfrac{e^x(x-1)^2}{(x^2+1)^2}$

63. $f(x) = \dfrac{x-8}{3x-4}$

Quotient Rule

$P = x - 8$

$P' = 1$

$Q = 3x - 4$

$Q' = 3$

$f'(x) = \dfrac{1(3x-4) - (x-8)(3)}{(3x-4)^2}$

$\qquad = \dfrac{3x - 4 - 3x + 24}{(3x-4)^2} = \dfrac{20}{(3x-4)^2}$

Tangent line at $x = 2$

Use point slope form

$f(2) = \dfrac{2-8}{6-4} = -3$

$(x_0, y_0) = (2, -3)$

What is m? $f'(2)$

$f'(2) = \dfrac{20}{(6-4)^2} = \dfrac{20}{4}$

$= 5$

Equation

$(y+3) = 5(x-2)$