Section 10.3 Solutions

#15] $f(x) = \dfrac{2x+3}{x-2}$

$T = 2x+3$

$T' = 2$

$B = x-2$

$B' = 1$

Use the Quotient Rule

$$f'(x) = \frac{BT' - B'T}{B^2}$$

$$= \frac{(x-2)^2 - 1(2x+3)}{(x-2)^2} = \frac{2x-4-2x-3}{(x-2)^2} = \frac{-7}{(x-2)^2}$$

#57] $f(x) = \dfrac{1}{x} = x^{-1}$ now use power rule

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

#77] $y = 9x^{1/3}(x^3+5)$

$F = 9x^{1/3}$

$F' = \frac{9}{3}x^{-2/3} = 3x^{-2/3}$

$S = x^3+5$

$S' = 3x^2$

Use the Product Rule

$$\frac{dy}{dx} = FS' + F'S$$

$$= 9x^{1/3}(3x^2) + 3x^{-2/3}(x^3+5)$$

$$= 27x^{7/3} + \frac{(3x^3+15)}{x^{2/3}}$$

$$= 27x^{7/3}\left(\frac{x^{2/3}}{x^{2/3}}\right) + \frac{3x^3+15}{x^{2/3}} = \frac{27x^3}{x^{2/3}} + \frac{3x^3+15}{x^{2/3}}$$

$$= \frac{30x^3+15}{x^{2/3}}$$