

Section 6.2*: #4, 64

6.3*: #33

6.4*: #50

6.2* #4

$$\underline{a} \quad \ln 10 + 2\ln 5 = \ln 10 + \ln 25 = \ln 250$$

$$\underline{b} \quad 3\ln(x-2) - \ln(x^2-5x+6) + 2\ln(x-3) \\ = \ln \frac{(x-2)^3 \cdot (x-3)^2}{x^2-5x+6}$$

6.2* #64

$$y = \frac{(x+1)^4 (x-5)^3}{(x-3)^8}$$

$$\ln y = 4\ln(x+1) + 3\ln(x-5) - 8\ln(x-3)$$

$$\frac{1}{y} \frac{dy}{dx} = \frac{4}{x+1} + \frac{3}{x-5} - \frac{8}{x-3}$$

$$\frac{dy}{dx} = \left(\frac{(x+1)^4 (x-5)^3}{(x-3)^8} \right) \left(\frac{4}{x+1} + \frac{3}{x-5} - \frac{8}{x-3} \right)$$

6.3* #33

$$\frac{d}{dx} (3x^2 - 5x)e^x = (3x^2 - 5x) \cdot e^x + e^x (6x - 5)$$

6.4* #50

$$\int \frac{2^x}{2^{x+1}} dx$$

$$u = 2^x + 1$$

$$du = 2^x \ln 2 dx$$

$$\frac{1}{\ln 2} du = 2^x dx$$

$$= \int \frac{1}{u} \cdot 2^x dx = \int \frac{1}{u} \cdot \frac{1}{\ln 2} du = \frac{1}{\ln 2} \int \frac{1}{u} du = \frac{1}{\ln 2} \ln|u| + C \\ = \frac{1}{\ln 2} \ln|2^x + 1| + C$$