

Math 1172 Homework #3

Section 6.2* #4a, 64

6.3* #33

6.4* #50

6.2* #4a

$$\begin{aligned}\ln 10 + 2\ln 5 &= \ln 10 + \ln 5^2 \\ &= \ln 10 + \ln 25 = \ln 250\end{aligned}$$

6.2* #64

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

$$\ln y = \ln \left(\quad \right)$$

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

$$\frac{1}{y} \cdot y' = \frac{4}{x+1} + \frac{3}{x-5} - \frac{8}{x-3}$$

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

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

6.3* #33

$$f(x) = (3x^2 - 5x)e^x$$

$$f'(x) = (3x^2 - 5x) \cdot e^x + e^x \cdot (6x - 5)$$

6.4* #50

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

$$u = 2^x + 1$$

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

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

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

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