

Math 1172

Homework #3

Section 6.2* 62/64, 70/72

Section 6.3* 76/79, 35/33

6.2* #62/64

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

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

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

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

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

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

6.2* #70/72

$$\int_e^6 \frac{dx}{x \ln x}$$

$$u = \ln x$$

$$du = \frac{1}{x} dx$$

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

$$= \ln|\ln x| \Big|_e^6 = \ln|\ln 6| - \ln|\ln e|$$

$$= \ln|\ln 6|$$

6.3* 35/33

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

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

6.3* 88/84

$$\int \frac{(1+e^x)^2}{e^x} dx = \int \frac{1+2e^x+e^{2x}}{e^x} dx$$

$$= \int e^{-x} + 2 + e^x dx$$

$$= -e^{-x} + 2x + e^x + C$$