

Marshall Math - HW Solutions Course Calculus

$$\#29) f(x) = e^{2x}$$

$$f'(x) = e^{2x}(2) = 2e^{2x}$$

$$\#31) f(x) = e^{-2x+x^2}$$

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

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

$$\#33) y = e^{\sqrt{x}}$$

$$y' = (e^{\sqrt{x}})\left(\frac{1}{2}x^{-1/2}\right) = \frac{1}{2\sqrt{x}}e^{\sqrt{x}}$$

$$\#35) g(t) = (e^{-t} + e^t)^3$$

$$g'(t) = \cancel{3(e^{-t} + e^t)^2(e^{-t} - e^t)}$$

$$g'(t) = 3(e^{-t} + e^t)^2[(e^{-t})(-1) + e^t(1)]$$

$$= 3(e^{-t} + e^t)^2(e^t - e^{-t})$$

$$\#37) y = \ln e^{x^2} = x^2$$

$$y' = 2x$$

$$\#39) y = \ln(1 + e^{2x})$$

$$y' = \frac{1}{1+e^{2x}} [0 + (e^{2x})(2)]$$

$$= \frac{2e^{2x}}{1+e^{2x}}$$

$$\#41) y = \frac{2}{e^x + e^{-x}}$$

$$y = 2(e^x + e^{-x})^{-1}$$

$$y' = (2)(-1)(e^x + e^{-x})^{-2}(e^x + e^{-x})(-1)$$

$$= \cancel{-2(e^x + e^{-x})^{-2}(e^x - e^{-x})}$$

$$= -2 \frac{e^x - e^{-x}}{(e^x + e^{-x})^2}$$

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$$\#43) y = x^2 e^x - 2x e^x + 2e^x$$

$$y = e^x (x^2 - 2x + 2)$$

<PRODUCT RULE>

$$y' = e^x (2x - 2) + e^x (1)(x^2 - 2x + 2)$$

$$= e^x (2x - 2 + x^2 - 2x + 2)$$

$$= e^x x^2 = x^2 e^x$$

$$\#45) f(x) = e^{-x} \ln x$$

<PRODUCT RULE>

$$f'(x) = (e^{-x})\left(\frac{1}{x}\right) + (e^{-x})(-1) \ln x$$

$$= e^{-x} \left(\frac{1}{x} - \ln x\right)$$

$$\#47) y = e^x (\sin x + \cos x)$$

<PRODUCT RULE>

$$y' = e^x (\cos x - \sin x) + e^x (\sin x + \cos x)$$

$$= e^x [\cos x - \sin x + \sin x + \cos x]$$

$$= e^x (2 \cos x)$$

$$= 2e^x \cos x$$