

Math 122 HW #2

- 2.4 #28
2.5 #46
4.4 #17, 37a
4.5 #8

2.4 #78

$$e^{x^2+5x+6} = 1$$

$$e^{x^2+5x+6} = e^0$$

$$x^2+5x+6=0$$

$$(x+2)(x+3)=0$$

$$x = -2, -3$$

2.5 #46 $\log_4(5x+1) = 2$

$$4^{\log_4(5x+1)} = 4^2$$

$$5x+1 = 16$$

$$5x = 15 \quad \underline{x=3}$$

4.4 #17

$$y = \frac{x^2}{e^x}$$

quotient rule:

$$\frac{dy}{dx} = \frac{e^x \cdot 2x - x^2 \cdot e^x}{(e^x)^2}$$

$$= \frac{2x - x^2}{e^x}$$

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

4.4 #37a

$$S(t) = 100 - 90e^{-.3t}$$

we need $S'(1)$

$$S'(t) = 0 - 90e^{-.3t} \cdot -.3 = \cancel{-27e^{-.3t}} + 27e^{-.3t}$$

$$\text{so } S'(1) = +27e^{-.3 \cdot 1} = +20$$

4.5 #8

$$y = \ln \sqrt{2x+1} = \ln((2x+1)^{1/2})$$

$$\frac{dy}{dx} = \frac{1}{\sqrt{2x+1}} \cdot \frac{1}{2} (2x+1)^{-1/2} \cdot 2$$

chain rule twice

$$= \frac{1}{\sqrt{2x+1}} \cdot \frac{1}{2} \cdot \frac{1}{\sqrt{2x+1}} \cdot 2$$

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