Math 1121 Homework #7

4.5 # 11/15, # 21/25

5.1 # 6/10, # 20/24

4.5 # 11/15 $y = -5x\ln(3x+2)$

$$\frac{dy}{dx} = -5x \cdot \frac{1}{3x+2} \cdot 3 + \ln(3x+2) \cdot (-5)$$

4.5 # 21/25 $y = (\ln|x+1|)^4$

$$\frac{dy}{dx} = 4(\ln|x+1|)^3 \cdot \frac{1}{x+1} \cdot 1$$

5.1 # 6/10

inc: $(1,5)$

dec: $(-\infty,1)$ & $(5,\infty)$

5.1 # 20/24

$f(x) = 3x^4 + 8x^3 - 18x^2 + 5$

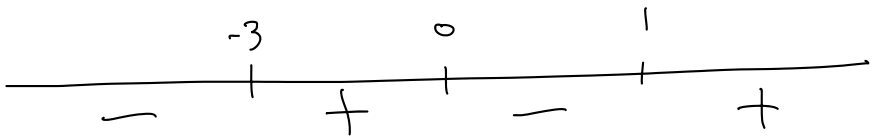
$f'(x) = 12x^3 + 24x^2 - 36x$

$= 12x(x^2 + 2x - 3)$

$\boxed{f'(x) = 12x(x+3)(x-1)}$

$f'=0$: $12x=0$ $x+3=0$ $x-1=0$

$x=0$ $x=-3$ $x=1$



$f'(-4) = 12 \cdot -4 \cdot (-4+3)(-4-1)$

$+ \quad - \quad - \quad -$

$f'(-1) = 12 \cdot (-1)(-1+3)(-1-1)$

$+ \quad - \quad + \quad -$

$f'(1/2) = 12(1/2)(1/2+3)(1/2-1)$

$+ \quad + \quad + \quad -$

$f'(2) = 12(2)(2+3)(2-1)$

$+ \quad + \quad + \quad +$

inc on $(-3, 0)$ & $(1, \infty)$

dec on $(-\infty, -3)$ & $(0, 1)$