

# Math 1121 Homework #2

Section 3.1 #47/57

Section 3.2 #10/18, 23bc/35bc

Section 3.3 #27a/31a

Section 3.1 #47/57

$$\lim_{x \rightarrow \infty} \frac{3x^3 + 2x - 1}{2x^4 - 3x^3 - 2}$$

= 0

(degree on bottom is bigger)

3.2 #10/18

$$f(x) = \frac{x^2 - 25}{x + 5}$$

Where is it discontinuous? set denom = 0:

$$x + 5 = 0$$

$$\boxed{x = -5}$$

$$\text{Now } \lim_{x \rightarrow -5} \frac{x^2 - 25}{x + 5} = \frac{(-5)^2 - 25}{-5 + 5} = \frac{25 - 25}{0} = \frac{0}{0}$$

$$\hookrightarrow \lim_{x \rightarrow -5} \frac{\cancel{(x+5)}(x-5)}{\cancel{x+5}} = \lim_{x \rightarrow -5} x - 5 = -5 - 5 = \boxed{-10}$$

3.2 #23bc

$$h(x) = \begin{cases} 4x+4 & \text{if } x \leq 0 \\ x^2-4x+4 & \text{if } x > 0 \end{cases}$$

need to check  $x=0$ :  
 $4x+4 \rightarrow 4 \cdot 0 + 4 = 4$   
 $x^2-4x+4 \rightarrow 0 - 4 \cdot 0 + 4 = 4$   
Same, so it is continuous at  $x=0$ .

No discontinuity points.

3.3 #27a/31a

$$N(p) = 80 - 5p^2$$

Avg ROC from 2 to 3:

$$\frac{N(3) - N(2)}{3 - 2} = \frac{80 - 5 \cdot 3^2 - (80 - 5 \cdot 2^2)}{1}$$

$$= 80 - 45 - (80 - 20) = 35 - 60 = \underline{-25} \text{ \$/box}$$