Math 1210-006 Assignment 2

Due September 10th

1 Problem List

Chapter 1 section 3: 3, 8, 15, 18, 24, 41, 44
Chapter 1 section 4: 1, 4, 12, 15, 18
Chapter 1 section 5: 1, 5, 10, 14, 15, 17, 25, 33, 37

2 Problems

2.1 Chapter 1, section 3

For problems 3, 8 use the 9 rules of theorem A to evaluate the limits. Be sure to show which rule you used for each step (if you don't have the text consult your notes for the 9 rules (Friday Aug 29th))

3.

$$\lim_{x\to 0}[(2x+1)(x-3)]$$

8.

$$\lim_{x\to -3}\sqrt{5x^2+2x}$$

For problems 15, 18, 24 find the indicated limit or state that it does not exist. You no longer have to state which rules you are using, but some algebraic simplification may be necessary before trying to evaluate the limit.

15.

$$\lim_{x\to -1}\frac{(x^2-2x-3)}{x+1}$$

18.

$$\lim_{x\to 2}\frac{x^2+7x+10}{x+2}$$

24.

$$\lim_{w\to -2}\frac{(w+2)(w^2-w-6)}{w^2+4w+4}$$

For problems 41, 44 find the right hand or left hand limit or state that it doesn't exist.

41.

$$\lim_{x\to -3^+} \frac{\sqrt{3+x}}{x}$$

44.

$$\lim_{x\to 1^-} \frac{\sqrt{1+x}}{4+4x}$$

2.2 Chapter 1, section 4

For problems 1, 4, 12 evaluate each limit.

1.

$$\lim_{x\to 0} \frac{\cos x}{x+1}$$

4.

$$\lim_{x\to 0} \frac{3x\tan x}{\sin x}$$

12.

$$\lim_{t\to 0} \frac{\tan 2t}{\sin 2t - 1}$$

For problems 15, 18 plot the functions $u(x)$, $l(x)$, and $f(x)$. Then use these graphs along with Squeeze theorem to determine

$$\lim_{x\to 0} f(x)$$

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15. $u(x) = |x|$, $l(x) = -|x|$, $f(x) = x\sin(1/x)$

18. $u(x) = 1$, $l(x) = 1 - x^2$, $f(x) = \cos^2 x$

2.3 Chapter 1, section 5

For all the problems find the limit.

1.
$$\lim_{x\to\infty} \frac{x}{x-5}$$

5.
$$\lim_{x\to\infty} \frac{x^2}{(x-5)(3-x)}$$

10.
$$\lim_{\theta\to\infty} \frac{\sin^2\theta}{\theta^2-5}$$

14.
$$\lim_{x\to\infty} \sqrt{\frac{x^2+x+3}{(x-1)(x+1)}}$$

15.
$$\lim_{n\to\infty} \frac{n}{2n+1}$$

17.
$$\lim_{n\to\infty} \frac{n^2}{n+1}$$

25.
$$\lim_{n\to\infty} \frac{n}{\sqrt{n^2+1}}$$

33.
$$\lim_{x\to 3^-} \frac{x^3}{x-3}$$

37.
$$\lim_{x\to 0^+} \frac{[[x]]}{x}$$

Recall that $[[x]]$ is the step function.