MATH 1210: Homework §1.1

due June 11, 2013

Instructions: Do the following problems. Show all of your work.

In Problems $1 - 17$, find the indicated limit. You may need to do some algebra first.

1. $\lim_{x \to 3}(x - 5)$

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

5. $\lim_{t \to -1}(t^2 - 1)$

7. $\lim_{x \to 2} \dfrac{x^2 - 4}{x - 2}$

9. $\lim_{x \to -1} \dfrac{x^3 - 4x + x + 6}{x^1}$

11. $\lim_{x \to -t} \dfrac{x^2 - t^2}{x + t}$

13. $\lim_{t \to 2} \dfrac{\sqrt{(t+4)(t-2)^4}}{(3t-6)^2}$

15. $\lim_{x \to 3} \dfrac{x^4 - 18x^2 + 81}{(x-3)^2}$

17. $\lim_{h \to 0} \dfrac{(2+h)^2 - 4}{h}$

Do the following

33. Sketch the graph of

$$f(x) = \begin{cases} -x & \text{if } x < 0 \\ x & \text{if } 0 \leq x < 1 \\ 1 + x & \text{if } x \geq 1 \end{cases}$$

Then find each of the following or state that it does not exist

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

(b) $\lim_{x \to 1} f(x)$

(c) $f(1)$

(d) $\lim_{x \to 1^+} f(x)$

38. Evaluate

$$\lim_{x \to 1} \frac{\sqrt{x+2} - \sqrt{2}}{x}$$

Hint: Rationalize the numerator by multiplying the numerator and denominator by $\sqrt{x+2} + \sqrt{2}$.