MATH 235 (SPRING 2014) QUIZ II

WED FEB, 26 2014

Name:

Attempt all problems. Box your answers.

(1) Find the following limits:

(a) $\lim_{x\to-\infty} 2x^3 + x^2 - 7$

(b) $\lim_{x\to-2} \frac{4+2x}{x^2+2x}$

(c) $\lim_{x\to0} \frac{3\sin x+x}{x}$

(2) Consider the function

$$f(x) = \begin{cases} \dfrac{1}{x+2} \text{ if } x < 0, \\ x + 1 \text{ if } x \geq 0. \end{cases}$$

(a) Describe the interval on which the following function is continuous, and specify the type of any discontinuities it has.
(b) Plot f.

(3) (a) Prove that $\lim_{x\to 2^+} 3\sqrt{2x-4} = 0$.

(b) Write down the statement of the formal definition of $\lim_{x\to-\infty} \frac{2x-1}{x} = 2$, then illustrate this definition using the graph of the function $\frac{2x-1}{x}$.

(4) **Bonus Problem (+2)** State the intermediate value theorem for continuous functions, then use it to estimate the root of the function $f(x) = 5 - x^4$ that lies in the interval $[0, 2]$. (Try to find a good estimate for the root, by choosing smaller and smaller intervals.)