1. **Write in complete mathematical sentences.** I am requiring this for two reasons. The first one is I want to know if you know why you are doing what you are doing and not just copying the "template" used in class. Note that writing in complete mathematical sentences does not mean that you write everything in words. Just write whatever you think will prove that you know what you are doing.

2. **You are only required to answer three items.** Let $wxyz - abcde$ be your student number. If e is odd, I will check only #1 and #3. If e is even, I will check only #2 and #4. I highly recommend you do ALL the exercises, though. No bonus will be given for answering items not assigned to you (except for the bonus knowledge you earn, which is also important).

3. **Each item must be alloted at least one page.** Do not start answering an item in the middle of a page. Go to the next page. Or better, go to the next spread. The bluebook has many pages. No need to cram everything in a few pages.

4. **Do not hesitate to consult if you need help.** This is a 2% of your final grade and you have more control to do better here than on the exams. If you have already given enough effort on a problem and you are still confused, feel free to schedule a consultation with your instructor.

5. **Submit your homework on or before April 22, 2013 at 5:00pm. Late homeworks will not be accepted.** Leave it on my shelf on MBAN 218. Be sure your homework is written on the bluebook I required you to have during the start of the semester.

1. Let $f(x) = \dfrac{4-x}{5-\sqrt{2x^2-7}}$.

   a. Find the domain of f.

   b. What type of discontinuity does f have at $x = -4$?

   c. What type of discontinuity does f have at $x = 4$?

   d. Evaluate $\lim\limits_{x \to \infty} f(x)$.

   e. Evaluate $\lim\limits_{x \to -\infty} f(x)$.

2. Let $g(x) = \begin{cases} -1 & x < -4 \\ 1 - \left|\frac{x}{2}\right| & -4 < x \le 3 \\ \frac{1}{x-5} & 3 < x < 6, x \ne 5 \\ \frac{3x^3 - 100x - 38}{427 - 2x^3} & x \ge 6 \end{cases}$.

   Note that the only real root of $427 - 2x^3$ is less than 6.

   a. Is g continuous on the interval $[3, 5)$?

      Back up your answer by evaluating the appropriate limits.

   b. Find the **three** points of discontinuity of g and classify each as a jump essential discontinuity, infinite essential discontinuity or removable discontinuity.

   c. Evaluate $\lim\limits_{x \to \infty} g(x)$.

3. Show using the Intermediate Value Theorem that there exists $c \in \left[\frac{\pi}{5}, \frac{4\pi}{5}\right]$ such that $\sin 5c = \cos c$. Be sure to verify if the assumptions of the Intermediate Value Theorem are satisfied.

4. Evaluate $\lim\limits_{x \to \infty} \dfrac{\cos x + 2x}{x + \sin x}$ using Squeeze Theorem.