

## Roby's Rules for Rewrites

Please note the following policies for rewrites of the exam. It's a lot of extra work and time for me to do this, so I greatly appreciate your cooperation! I think the added learning makes it worth the effort.

1. Please staple your original exam on **top** of the corrections. This way I can easily see how much you scored the first time.
2. Please put your name on the back of the last page of your **rewrite** for easy identification.
3. You may rewrite any problem on which you lost a total of 2 or more points. In addition to rewriting the problem you got wrong, you must do the problem from the **Midterm Rewrite Problems** (verso).
4. Please rewrite the **entire** answer to each part of problem where you want extra points, even if it means copying things you already did correctly. Otherwise I have to check back and forth, which takes much more time. If you already got a part of a problem completely correct, just say something like "(a) received full credit".
5. Double check your answers (with friends or however). Often you can see whether your answer makes sense just by checking it against the original problem.
6. You may discuss problems with your classmates or others, but please indicate your source if you get significant help. (It won't affect your score.)
7. Expect the grading of rewrites to be tougher than the in-class exam. You have ample time to check your answers for clarity and completeness. Your rewrites should be perfect.
8. You can receive up to half the points you missed on any problem. Ideally, I will look at your rewrite, note that it's correct and complete, and give you half of all the points you missed.

Thanks again for your help with this. Feel free to contact me with questions after class, in office hours, or by email.

## Math 213/Roby **Midterm Rewrite Problems** 18 October 2007

1. Write the negation for each of the following sentences, avoiding tautologies like “It is not the case that...”. You may use logical models as a guide, but your final answer should be in the same style as the original sentence (plain English).

- (a) If the weather is good, I go out drinking.
- (b) For every pair  $x, y \in \mathbb{R}$ , there is a real number  $z$  such that  $x < z < y$ .
- (c) There is an integer  $N > 0$  such that  $|a_n - a| < \frac{1}{100}$  whenever  $n > N$ .

2. Let  $f : X \rightarrow Y$ ,  $g : Y \rightarrow X$ . Prove or Disprove and Salvage (with proof) if Possible:

- (a) If  $f(g(y)) = y$  for all  $y \in Y$ , then  $f$  is a bijection.
- (b) If  $g(f(x)) = x$  for all  $x \in X$ , then  $f(g(y)) = y$  for all  $y \in Y$ .

3. Find the set of all  $n \in \mathbb{N}$  such that

$$\frac{1}{3^{n+1}} \leq \frac{1}{n^4}.$$

and use induction to prove your answer.

4. Prove that there is no rational number  $x$  such that  $x^2 = 3$ .
5. Let  $A$  and  $B$  be subsets of the domain of a function  $g$ . Prove or Disprove and Salvage (with proof) if Possible:

$$g(A \cap B) = g(A) \cap g(B)$$

6. Let  $f$  and  $g$  be functions from  $\mathbb{R}$  to  $\mathbb{R}$ . Prove or Disprove and Salvage (with proof) if Possible:

- (a) If  $f$  is injective, then  $f$  is unbounded.
- (b) If  $f$  is surjective, then  $f$  is unbounded.
- (c) If both  $f + g$  and  $fg$  are bounded, then  $f$  and  $g$  are bounded.

7. Let  $k \in \mathbb{N}$ . Determine all  $(x, y) \in \mathbb{R}^2$  such that  $\sum_{j=0}^{2k} x^{2k-j} y^j = 0$ .

8. Just doing the original problem is sufficient.