

## Math 112 homework #4: Orderings. Due 10/24

*Be steady and well-ordered in your life so that you can be fierce and original in your work.*

- Gustave Flaubert [standard translation]

- (1) Review the end of chapter 2 of the course notes on orders and inequalities. Read the short handout on the Well-Ordering principle (given in class on Friday, also up on chalk)
- (2) Write a brief (about 4 or 5 sentences) summary of the Well-Ordering reading. You will have to think carefully to capture the essence of the content in 4 sentences.
- (3) Do Exercises (2) and (3) from the Well-Ordering handout.
- (4) Do the following exercises from pages 86-90 of the course notes:
  - 2.11 b)
  - 2.11 c) [hint: use your work from 2.10 last week]
  - 2.14
  - 2.17
- (5) Recall the *even-odd* arithmetic that we defined in class. In this exercise, you will show that there is no order on *even-odd* that satisfies O1-O4. Here is a step-by-step plan.
  - Do a proof by contradiction. Suppose there is an order on *even-odd*
  - Now use our " $0 < 1$ " theorem (cor. 2.11 in the book) to conclude something about this order
  - Now add "1" (in this case *odd*) to both sides of the equation you got above.
  - Does this contradict transitivity and trichotomy? Explain.