Review for Exam I

Exam I will take place next Friday, February 4.

If you need help, please come to see me in my office during regular office hours or set up an appointment to see me / talk to me outside of office hours. Also, remember that the Mathematics Tutoring Room in Hinkle 126 is open (including Sunday afternoon) and ready to help you!

Exam I will cover chapter 1. In addition to the main topics, please make sure that you

- Review all homework problems
- Review all quizzes
- Review all class notes
- Review all handouts
- Review the textbook
- Review how to use your calculator – you will be expected to be “fluent” in its use.
  
  *Note: By “review” I mean for you to take an active role – actually try each of the problems. Reading through my solutions is a good start, but it will not help as much as actually doing the problems as you read through the notes. Remember that you can download a fresh copy of the chapter 1 handout from my webpage online.*

Also,

- Make sure that you have completed all homework assigned.
- Make sure that you get a good night’s sleep on Thursday
- *Make sure that you bring your calculator to the exam.* (Note: only TI-83, TI-84’s are allowed. All other types of calculators must be approved by me.)
- Leave all backpacks, notes, etc. at the front of the classroom for the duration of the exam.
- Sit in alternating seats wherever possible.

In particular, make sure that you know the following topics. Note that these are general headings only, and that there may be other topics that we covered and that could be on the exam.

- Models – in English, in graphs, in formula form and in tables
- Be able to identify the inputs (numerically and in words) and the outputs (ditto) to a function.
- Reading and interpreting from a graph
- Functions: from a table, graph, sentence or equation
- Input/output diagrams and how to construct one
- Definition of functions and the vertical line test
- Finding outputs given inputs and vice versa
- Combining functions: +, -, *, /, and function composition
- Cost, average cost, revenue, breakeven, profit, fixed cost, variable cost, breakeven and all formulas relating these concepts
- Units on the input and on the output. (Ex: \( f(x) \) is the number of chickens born on a farm on day \( x \) of the year. The inputs are the day of the year and the output is the number of chickens born (on that day of the year)).
- Linear functions – what it means to be one
- Increasing / decreasing functions
- How to use the point-slope, slope-intercept equations to find the equation of a line
- Constant rate of change of linear functions (i.e. the slope!)
- Units on the constant rate of change (you get this from the rise/run. So from the chicken example above, the slope’s units would be chickens per day)
- Concavity of a linear function (there isn’t any concavity ☹️)
- How to graph a scatterplot on your calculator
- Extrapolation vs interpolation
- Finding a best-fit linear model and looking at the rate of change and the slope (using calculator)
- $e^x$ and ln(x): what their graphs look like and how to use them
- concave up / concave down and what this means
- Exponential functions: growth, decay – what they look like, and the equation type.
- Constant percentage change in exponential models
- Finding exponential and logarithmic models on your calculator
- How to do problems like I. on page 12 of the handout (or 16a in section 1.3)
- End behavior of exponential and logarithmic models
- End behavior for all of the models
- Logistic models
- The limiting value for logistic models – how to find from the equation and from the graph.
- Concavity and inflection points for logistic models
- Limit notation and what it means
- Horizontal asymptotes
- End behavior for logistic models
- Quadratic modeling: how to do on calculator, concavity, end behavior, and how it differs from exponential/log models
- The formula for the vertex of a quadratic model and how to find it.
- Cubic modeling: how to do on a calculator, concavity, inflection points, end behavior, and how it differs from logistic models
- Figuring out the best model for data and giving conclusive reasons to back up your choice. Note: correlation should not be used except in the case of a linear model.
- Choosing the best model for data.
- Note: there is a review of much of this material on pages 21-23 of your chapter 1 handout

Good luck! I am sure that you will all do great!