# MATH 117: Exam # 2 Review Outline

Instructor: Joseph McGuire

So first off the exam will be due: **November 6 @ 11:59pm**. I will also be **not accepting late work for this exam**. So get started on this as soon as possible and ask questions when you need to. I expect excellent work from you all, good luck!

The exam will be posted October 30 @ midnight, so you will have exactly one week to complete it.

For reviewing for the exam, I would highly recommend reviewing being familiar with, and being able to apply the following concepts:

- Compound Interest:
  - Find the amount of money after time $t$
  - Make sure you know what the units of $t$ are; is $t$ in years? months? days? and make sure that agrees with the units of $n$ ($n$ will be in units of years).
  - When you have $A(t) =$ "something", using it to solve for $r$ (interest rate per year).
- The Natural Exponential Function:
  - How did we find the function from the Compound Interest Formula?
- The Continuously Compounded Interest Formula:
  - Know what it means, and how it's related to the normal compound interest formula
  - Be able to use it to find the amount of money after a time $t$
  - Be able to solve for $r$ when given a $A(t) =$ "something".
- Logarithmic Equations
  - Be able to switch between the logarithmic form of an equation and its exponential form.
  - Know the properties (laws) of logarithms and how to use them
- Models

- Know the difference between an equation:

$$\frac{d}{1+ke^{-ct}}$$

and

$$\log_a(x)$$

- Know all the exponential growth models like:

$$n_0 2^{t/a}, n_0 e^{rt},$$

what each of the constants above mean, and when to use them.

- Know all the exponential decay models:

$$m_0 2^{-t/h}, m_0 e^{-rt},$$

what each of the constants mean, and when to use them.

- Know how to convert from a doubling(halfing)-time model like $n_0 2^{t/a} \to n_0 e^{rt}$ or $n_0 2^{-t/h} \to m_o e^{-rt}$.
- Newton's Law of Cooling:

$$T(t) = T_s + D_0 e^{-kt}$$

know what the constants are above, review the examples in the book and videos, and what does it mean?

- Know what the end behaviors of all of the models look like generally, and any special points they may have.

- Graphing Logarithms and Exponentials
  - Know what the graph of $a^x$, $a^{-x}, \log_a(x), \log_a(-x), -\log_a(x)$ look like
  - Where there special points are, such as where does $a^x = 1$, $\log_a(x) = 0$, where is $\log_a(x) > 0$ and $\log_a(-x) < 0$?
  - Be able to shift these up, down, side-to-side