# Objectives Assessed by MA 153 Test 2
## Chapter 3 and Chapter 4 (not 4.4)
*Saturday, Oct. 25 – Monday, Nov. 3*

1. Given a formula, get an annual growth rate or decay rate, as well as an initial amount.
   **3.1** – 16, 26 and **3.2** – 1, 38 and **3.3** – 16, **Chapter 3 Review** –11

2. Given an annual growth rate or decay rate and an **initial** amount,
   a. write a formula $y = ab^x$ or
   b. predict a future value of $y$ for some $x$ and given a value of $y$, find a value of $x$.
   **3.1** – 1-4, 21-25, 27-31, 33, 34 and **3.2** – 2, 3, 6-9, 11, 14, 18-20, 36, 37,39-41 and **3.3** – 15, 18, 38 and **Chapter 3 Review** – 10, 13-15, 47-49, 50

3. Given some data (which is not an initial amount).
   a. write a formula for an exponential function
   b. Know what $a$ and $b$ mean in the formula $y = ab^x$.
   c. Predict a future value of $y$ for some $x$ and given a value of $y$, find a value of $x$.
   **3.2**- 5, 15-17, 21-23, 26-29, 31, 33, 34 and **Chapter 3 Review** – 16, 17, 34-37, 43-45, 50

4. Match an equation to a graph. Know what $a$ and $b$ (or $k$) mean in $y = ab^x$ or $y = ae^{kx}$.
   Understand general shape, concavity, domain, range, asymptotes, etc.
   **3.3** – 3, 4, 19, 24, 25, 26, 37, 41 and **3.4** – 1, 2, 5, 6 and **3.5** – 5 **Chapter 3 Review** – 19, 20

5. Use the compound interest formula $A = P(1+\frac{r}{n})^{nt}$ or $A = Pe^{rt}$ appropriately to
   a. Find one value if given the other values.
   b. Find the annual growth rate (effective annual yield).
   **3.4** – 8, 9, 15, 16 and **3.5** – 7, 8, 11-14, 16, 18-20, 24 and **Chapter 3 Review** – 32

6. Understand and use logarithms:
   a. Write a statement involving exponential form into logarithmic form and vice versa.
   b. Understand the inverse properties $e^{\ln W} = W$ and $\ln e^W = W$ or $10^{\log W} = W$ and $\log 10^W = W$
   Be able to write something like $\frac{1}{\sqrt{e^x}} = e^{-x/2}$ and then find $\ln\left(\frac{1}{\sqrt{e^x}}\right) = \ln e^{-x/2} = -\frac{x}{2}$
   c. Know how to evaluate a logarithm such as $\log_2 16$. (See worksheet on logs).
   d. Understand and use power property (Bob Barker property) and sum and difference properties of logs.
   **4.1** – 1-10, 19-21, 23-30, 54 and **Chapter 4 Review** 27-29, 46 and worksheet on logarithms

7. Solve an exponential equation for exact solutions (and approximate solutions)
   a. with $x$ on one side of the equation. See **4.1** 11-13, 40 and **Chapter 4 Review** – 7, 8
   b. with $x$ on one side – multistep See **4.1** #14-18, 34, 37, 38, 41,43-45 **Ch 4 Review** 9, 10, 22**,** 41b, parts of 47

8. Given an initial amount and a growth rate over some period of time,
   a. write a formula for an exponential function
   b. determine half-life or doubling or tripling time
   c. determine the growth rate per period of time
   **4.2** – 9-16, 19-27, 34, 48 and **Chapter 4 Review** 13, 41

9. Solve a logarithmic equation (and use $pH = -\log[H^+]$) . See **4.1** 36 and **4.3** 13-17, 32, 34a and **Ch 4 Rvw** 47de

10. a. Recognize linear vs. exponential growth
    b. Find formulas for linear functions and exponential functions if given its initial value and information on how it grows.
    c. Solve an equation involving an exponential function and a linear function.
    Read page 120 **Exponential Growth Will Always Outpace Linear Growth in the Long Run** and read bottom of page 164 **Exponential Growth Problems That Cannot Be Solved By Logarithms** and do **3.2** --30 and **4.2** – 38, 39 and **Chapter 4 Review** 47gi

11. Understand general shape, concavity, domain, range, asymptotes, etc. of the graph of $y = \log x$ or $y = \ln x$. **4.3** – 1-6, 21

<u>Start Your Review by doing the following:</u>
**Check Your Understanding Chapter 3**: 1-20, 24-32
**Check Your Understanding Chapter 4**: 1-22