

## Review Sheet for Unit Five Exam Modeling Algebra

The best way to prepare for this exam is to do lots of problems. Your MyLabsPlus site has review problems and a practice exam that you can work as many times as you like. Ideally, you should work until you can do all problems easily. The practice exam has a few more problems than the real thing, but is comparable.

Be sure to review the pages we completed in the workbook for this unit.

Here are the main topics in each section of this unit:

**Section 4.2 Combining Functions; Composition of Functions:** try these pp. 270-274; #5, 15, 21, 25, 28, 29, 43, 44, 50, 51

- Sums, differences, products, and quotients of two functions
- Average cost functions
- Function composition
- Explain the meaning of the composition function in words

**Section 4.3 One-to-One and Inverse Functions:** try these pp. 282-286; #6, 8, 9, 15, 25, 30, 37, 38, 48

- Determine if a function is one-to-one
- Find the inverse of a functions
- Graph inverse functions
- Determine if two functions are inverses
- Find inverse functions on limited domains
- Interpret the inverse function

**Section 5.1 Exponential Functions:** try these pp. 323 - 326; #4, 7, 9, 12, 21, 24, 31, 37, 40, 43

- Graph and apply exponential functions
- Find horizontal asymptotes
- Use exponential functions to model exponential growth and decay
- Compare transformations of graphs of exponential functions

**Section 5.2 Logarithmic Functions; Properties of Logarithms:** try these pp. 340 - 343; #1-8, 31-38, 55, 59, 61, 69, 71, 72

- Graph and evaluate logarithms without using a calculator
- Convert between exponential and logarithmic equations, this is an essential skill
- Know how to use properties of logarithms
- Understand that the Natural logarithm is equivalent to  $\log_e x$
- Solve application involving pH, Richter scale and Decibels

**Section 5.3** : try these pp. 353 - 355; # 8, 17, 20, 23, 24, 48, 54

- Know how to solve an exponential equation by rewriting in its equivalent logarithmic form
- Know how to solve a logarithmic equation by rewriting it in its equivalent exponential form

**Section 5.4** : try these pp. 368 - 374. ; #1, 2, 3, 7, 17-20, 22, 23, 36

- Model data with exponential functions (regression)
- Model an exponential function given either the growth or decay factor OR growth or decay rate and the initial value
- Recognize if a given data set is exactly exponential, approximately exponential, linear, or quadratic
- Compare the different types of models to determine which one best fits your data

**Section 5.5 Exponential Functions and Investing:** try these pp. 383 - 386; #7, 15, 19, 22, 27, 39, 41, 47

- Compute future value of an investment with annual compounding, **you need to know the equation used to find the future value**  $S = P \left( 1 + \frac{r}{k} \right)^{kt}$
- Compute future value of an investment with periodic compounding
- Compute present value of an investment
- Use calculator to make investment models

**Things to know:** Everything!

Practice Problems

Solve the equations:

1.  $12e^{2t-1} = 1200$ , leave your answer in terms of the natural log
2.  $5 \ln x = 1$ , leave your answer in terms of "e"
3. Expand the expression  $\log_3 \frac{(x-1)^2}{3x}$

4. Rewrite the following expression using a single logarithm: After you rewrite as a single logarithm simplify the expression.  $\ln(x + 1) - \ln(x^2 - 1) + \ln(x - 1)$   
.
5.  $\log_3 x + \log_3(2x - 3) = -1$
6. Let  $f(x) = 2x^2 - 1$  and let  $g(x) = 3x + 4$ . Find  $f(g(x))$ ?
7. Let  $f(x) = 2x + 1$  and  $g(x) = x^2$ . Find  $f(g(2))$  and  $g(f(-1))$ .
8. Are the functions  $p(x) = \frac{1}{2}x - 3$  and  $q(x) = x + 6$  inverses of each other?
9. Suppose you invest \$100 in an account with 7% interest compounded monthly. How long will it take to triple your money?