

1011 Precalculus Chapter 3: Concepts to Review

This is a list of the concepts we have studied in Chapter 3. You should be able to answer questions dealing with these concepts. Study the homework, problems done in class, homework which was turned in for grading, and examples worked in the textbook. Algebraic solutions to equations involving exponential and logarithmic equations was very important in this chapter.

Previous work that will be needed

- composition of functions
- quadratic formula
- inverse functions
- transforming functions
- basic properties of functions (domain, range, symmetry, etc)

Chapter 3

- exponential functions $y = e^{kx}$ or $y = b^x$ (3.1)
- logistic functions $y = \frac{c}{1 + ae^{-kx}}$ (3.1)
 - properties of exponents (page 8): If x and y are real numbers, and $b > 0$ is real, then
 1. $b^x \cdot b^y = b^{x+y}$
 2. $\frac{b^x}{b^y} = b^{x-y}$
 3. $(b^x)^y = b^{xy}$
 - nomenclature: base, exponent
 - exponential growth ($b > 1$) and exponential decay ($0 < b < 1$)
 - the natural base e
 - the basic functions $y = e^x$ and $y = \ln x$
 - sketching and transforming exponential functions
- constructing exponential population models (3.2)
- logarithmic functions $f(x) = \log_b x$ (3.3)
 - interpreted as the inverse function of the exponential function
 - sketching and transforming logarithmic functions
 - properties of logarithms (3.4): If x and y are positive numbers, and $b > 0, b \neq 1$ is real, then
 1. $\log_b(xy) = \log_b x + \log_b y$
 2. $\log_b\left(\frac{x}{y}\right) = \log_b x - \log_b y$
 3. $\log_b(x^r) = r \log_b x$ where r is any real number
 - change of base
 - common logarithms ($y = \log x$) and natural logarithms ($y = \ln x$)
- solving equations involving logarithms and exponentials (3.5)
 - extraneous solutions