MATH 150

Today

1. Go over exam (briefly)
2. 5.1: Exponential and logarithmic functions
3. Homefun

Goals:

1. Exponential functions (Understand the form, definitions, laws, and graphs of exponential functions)
2. Logarithmic functions (Understand the form, definitions, laws, and graphs of logarithmic functions)

Where is today's material used?

1. Physics: radioactive decay
2. Biology: population growth
3. Economics: interest

5.1 Exponential and Logarithmic Functions

1. Exponential functions:
   (a) Definition, domains, terminology (a^x, domain $(-\infty, \infty)$, range $(0, \infty)$)
   (b) Exponent laws (same as always!)
   (c) Properties of exponential functions (nonzero, 1-1, and invertible)
   (d) The natural exponential function (e^x, $e \approx 2.71828$)
2. Logarithmic functions

(a) Defined as the inverse of an exponential function ($\log_a(a^x) = x, a^{\log_a(x)} = x$)

(b) Domain, range, asymptote (Domain $(0, \infty)$, range $(-\infty, \infty)$ VA $x = 0$)

(c) Natural logarithmic function $\ln(x)$

(d) Relationships between exponential and logarithmic functions ($\ln e^x = x, e^{\ln x} = x$)

(e) Properties of logarithms ($\log_a(xy) = \log_a(x) + \log_a(y), \log_a(x/y) = \log_a(x) - \log_a(y), \log_a(x^y) = y \log_a(x)$)

3. Examples. p. 349: 23-28, 29, 31, 32, 33, 34, 35, 36, 37, 41, 48, 49, 51, 54, 29, 56, 57, 65, 69, 71-74, 75, 76-80

Next Time

1. Watch 5.2: Limits of exponential and logarithmic functions [18 min]