Lesson 14

Read Chapter 12

Logarithms

$\ln x$ is the inverse of e^x. This means

$$e^x = y$$

$$x = \ln y$$

$$\ln e^x = x$$

$$e^{\ln y} = y$$

Graph

Other log functions

$\log_a x$ is the inverse of a^x

properties of log

- $\ln x^y = y \ln x$
- $log_b x = \frac{\ln x}{\ln b}$
- $a^x = e^{(\ln a)x}$
- $\ln(xy) = \ln(x) + \ln(y)$
- $\ln \frac{x}{y} = \ln x - \ln y$
- $\ln 1 = 0$
- $\ln \frac{1}{x} = -\ln x$

Solve the following equations

1. $5e^{x-4} = 2$

2. $5\,3^{x-4} = 2$

Solve the following equations

1. $5\ln(5x + 2) = 3$

2. $log_2(5x + 2) = 3$

Solve the following equations

1. $log_2 5 = \log_3(7 - x)$

2. $5y = 10^x$

Exponential functions in standard form

$$f(x) = A_0\, a^x$$

or

$$f(x) = A_0 e^{(\ln a)\, x} = e^{kx}$$

Rewrite in e form

- $y = 5\,7^t$

- $y = 3\,2^{3t-1}$