Math 3 3.6 Natural Logarithms & Base *e* Unit 3

*EQ: How do you solve logarithmic equations involving natural logs and base e?*

**Natural base exponential function**: 

**Natural Logarithm**:

 logarithm with base *e*

**Natural logarithm function**:

y = ln(x) or y = loge(x)

**Evaluate Natural Base Expressions:**

\*simply type “ln (insert number) enter” in your calculator\*

a) ln 3 b) ln 

c) ln 4 d) ln 0.05

**Example 2:** Simplify the expression

1. 
2. 

**Example 3:** Write each expression as a single natural logarithm.

*Use the properties of logs to condense!*

1. 
2. 
3. 
4. 

**Example 1:** Simplify the expression

1. 
2. 

**Evaluate Natural Base Expressions:**

\*simply type “2nd ex (insert number) enter” in your calculator\*

a)  b) 

c)  d) 

Example 5: Solve Natural Log Equations

After isolating the *ln*, SWOOSH into exponential form.

1. 
2. 
3. 
4. 

Example 4: Solve Base *e* Equations

*After isolating the e, SWOOSH into logarithmic form.*

1. 
2. 
3. 
4. 

**Applications of Natural Logs and Base e**

\*\*\*To calculate continuously compounded interest, we use the formula:

 **y = r =**

 **P = t =**

**Example 6:** How much money will be in a bank account after 1.5 years if you invested $400 at 7.6% compounded continuously?

**Example 7:** How much time would it take to triple your principal in an account that pays 6.5% annual interest compounded continuously?

**Practice:** Complete the following problems for class work. Show all work.

1. Solve ln(14x – 3) = ln(7x + 11)
2. Solve 2ex – 5 = 1
3. ln(x – 1) = -2
4. ln(2x – 3) = 2.5
5. ln 48 – lnx = ln4
6. e3x ∙ ex = 15

**Mixed Review:** Remember, *all* logarithms share the same rules. Always condense first before solving!

1. 
2. 
3. log2 *x* = *−*3
4. log2 64 = x
5. log2x – log2 5 = 3
6. ln4x + ln 5 = ln 20
7. Mazie invested $4500 in an account earning 4.3% interest compounded continuously. After how many years will she have $7400 in her account?