

Base e Exponential Functions ... Set 1

Math 3

Natural Logarithms & Base e

SWBAT solve logarithmic equations involving natural logs and base e.

<p>Evaluate Natural Base Expressions: *simply type "2nd e^x (insert number) enter" in your calculator*</p> <p>a) $e^{0.5}$ b) e^{-8}</p> <p>c) e^2 d) $e^{-1.3}$</p>	<p>Natural base exponential function: $y = e^x$</p> <p>Natural Logarithm: logarithm with base e</p> <p>Natural logarithm function: $y = \ln x$</p>	<p>Evaluate Natural Base Expressions: *simply type "ln (insert number) enter" in your calculator*</p> <p>a) $\ln 3$ b) $\ln \frac{1}{4}$</p> <p>c) $\ln 4$ d) $\ln 0.05$</p>
<p>Example 1: Simplify the expression</p> <p>a) $\frac{\ln e^4}{8}$</p> <p>b) $\ln e^{83}$</p>	<p>Example 3: Write each expression as a single natural logarithm. Use the properties of logs to condense!</p> <p>a) $3 \ln 5$</p> <p>b) $\ln 24 - \ln 6$</p> <p>c) $\frac{1}{3}(\ln x + \ln y) - 4 \ln z$</p> <p>d) $2 \ln 8 - 3 \ln 4$</p>	<p>Example 2: Simplify the expression</p> <p>a) $10 \ln e$</p> <p>b) $\ln 1$</p>
<p>Example 4: Solve Base e Equations After isolating the e, use ln on each side to cancel out the e</p> <p>a) $e^{\frac{x}{4}} + 3 = 9$</p> <p>b) $5e^{-x} - 7 = 2$</p> <p>c) $3e^{-2x} + 4 = 10$</p> <p>d) $e^{3x+1} = e^{13}$</p>		<p>Example 5: Solve Natural Log Equations After isolating the ln, use e on each side to cancel out the ln</p> <p>a) $\ln 5 - \ln x = 4$</p> <p>b) $\ln(2m + 3) = 8$</p> <p>c) $\ln \frac{x-3}{4} = 8$</p> <p>d) $3 \ln 3x^2 = 1$</p>

Base e Exponential Functions ... Set 1

Applications of Natural Logs and Base e

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

$$y = \quad \quad \quad r =$$

$$P = \quad \quad \quad t =$$

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

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

1. Solve $\ln(14x - 3) = \ln(7x + 11)$

2. Solve $2e^x - 5 = 1$

3. $\ln(x - 1) = -2$

4. $\ln(2x - 3) = 2.5$

5. $\ln 48 - \ln x = \ln 4$

6. $e^{3x} \cdot e^x = 15$

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

7. $4^{3x} = 12$

8. $\log_6 x + \log_6 9 = \log_6 54$

9. $\log_2 x = -3$

10. $\log_2 64 = x$

11. $\log_2 x - \log_2 5 = 3$

12. $\ln 4x + \ln 5 = \ln 20$

13. Mazie invested \$4500 in an account earning 4.3% interest compounded continuously. After how many years will she have \$7400 in her account?