Algebra II

Lesson 8-6: Natural Logarithms

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In section 8-2 we learned that the number $e \approx 2.71828$. We then learned that the inverse of an exponential function is a log function. Well, the inverse of e^x is the **natural logarithm function,** abbreviated **ln**. Since these are inverses, they "undo" one another.

$$y = e^x$$
$$log_e y = x \quad or \ln y = x$$

Just as the previous section, we are able to treat the natural logs as we do the base 10 logs by solving in similar fashion, and our properties hold true for natural logs as well

Write as a single natural logarithm

$5 \ln 2 - \ln 4$	$3 \ln x + lny$

Variable is argument in natural logarithm equation: solve just like any logarithm. Remember the base is **e**

$\ln_e(3x - 9) = 21$	1. base **e** to a power is equal to…. 2. with a calculator evaluate the *e value* 3. simplify and solve for x yes, that is some big number!
$\ln (3x + 5)^2 = 4$	$lnx = -2$

Variable is exponent in exponential equation

When we have an exponential equation with *e* as the base, we can take the natural log of both sides to simplify. When we do this however, realize that the natural log of *e* cancels out, leaving just the exponent behind on the ground floor:

$e^{\frac{2x}{5}} + 7.2 = 9.1$	1. Isolate the variable: Clear extra constants. 2. take the natural log of both sides, understand that the natural log of *e* cancels out and leaves the exponent behind 4. Use the calculator to evaluate the **ln** of the constant 3. Now solve for x algebraically.
$e^x = 18$	$7e^{2x} + 2.5 = 20$