WARM UP

Pick up a blue handout on the table; then, simplify these four:

$\ln e^{5} = 5$	$e^{\ln 5} = 5$
$\ln e^{19x^2+7} = 19x^2+7$	$e^{\ln(19x^2+7)} = 19x^2+7$

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Exponential Equations	Logarithmic Equations
Are the bases the same? $5^{2x}=5^{x-4}$ $2x=x-4$ $-x\ -x$ $x=-4$	CONDENSE.
Can you make the bases the same? $4^{x^2-2}=16^{3x^2-6}$ $(4^2)^{3x^2-6}$ $4^{x^2-2}=4^{6x^2-12}$ $x^2-2=6x^2-12$ $10=5x^2$ $\pm\sqrt{2}=\sqrt{x^2}$ $x=\pm\sqrt{2}$	Is there one log on both sides of the equation?
Take $\log_b$ of boths sides (typically ln). $5^{x-2}=20$ $\ln 5^{x-2}=\ln 20$ $(x-2)\ln 5=\ln 20$ $\frac{(x-2)\ln 5}{\ln 5}=\frac{\ln 20}{\ln 5}$ $x-2=1.86$ $+2\ \ +2$ $x=3.86$	Convert to exponential form.

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3.4 - Part I: Solving Exponential Equations

Method I: Equate Bases - Make the bases the same.

$5^{2x}=5^{x-4}$

$4^{x^2-2}=16^{3x^2-6}$

p. 221, #17, 21 (HW)

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What happens if we can't make the bases the same?

Method 2: Take $\log_b$ of both sides.

$5^{x-2}=20$

$\frac{50e^{-2x}}{50}=\frac{13}{50}$

$\ln e^{-2x}=\ln\left(\frac{13}{50}\right)$ $e^{-2x}=\frac{13}{50}$

$\frac{-2x}{-2}=\frac{\ln\left(\frac{13}{50}\right)}{-2}$

$x\approx 0.674$

p. 221, #45 (HW)

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One more type: "Quadratic in Form"

Treat like a quadratic equation, where you have e^x instead of just x.

$e^{2x} - 3e^x = -2$

$e^{2x} - 3e^x + 2 = 0$

$(e^x - 2)(e^x - 1) = 0$

$e^x - 2 = 0 \quad e^x - 1 = 0$

$e^x = 2 \quad e^x = 1$

$x^2 - 3x + 2$

$\ln e^x = \ln 2 \quad \ln e^x = \ln 1$

$x = \ln 2 \quad x = \ln 1$

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HOMEWORK

...solving equations (due Wednesday)

3.4 (p221): 17-61 (1,5,7's); omit 31-37

85-135 (1's and 5's only; omit 105, 111, and 115)

Who has a Google account?

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