Calc AB   Lesson 16   8/18/15

HW leader:
Lesson 16
  • Log equations
  • exponential equations
○ Quiz extra at end

Period 3   Period 4
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Log Equations:

Ex. 16.2 Solve for x: $\ln(x-1) - \ln(x+2) = \ln(14)$

$\ln\left(\frac{x-1}{x+2}\right) = \ln(14)$ Property $\boxed{\text{If } \log_b x = \log_b y \text{ then } x = y.}$

$\frac{x-1}{x+2} = 14$

$x - 1 = 14x + 28$ Check:

$x = \frac{-29}{13}$ $\ln\left(\frac{-29}{13} - 1\right)$ is not defined

                                  $\boxed{\text{No Solution}}$

Ex. Solve for x: $\log(4-x) + \log(1-x) = 1$

$\log((4-x)(1-x)) = 1$ Check:

$(4-x)(1-x) = 10$ $\log(4-6) = \log(-2)$ DNE

$x^2 - 5x - 6 = 0$ $\log(5) + \log(2) = \log(10) = 1$ ✓

$(x-6)(x+1) = 0$

$x = 6$ or $x = -1$ $\boxed{x = -1}$

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Exponential Equations :

Ex. Solve for x without using Logarithms: $8^{3x+2} = \frac{1}{16}$

      • Write in a common base − 2

$$(2^3)^{3x+2} = 2^{-4}$$

$$9x + 6 = -4$$

$$9x = -10$$

$$\boxed{x = -\frac{10}{9}}$$

Question why are we not required to check?
You can still do it to check your work.

Ex. 16.8   Solve $5^{2x-1} = 6^{x-2}$ for x.

Choose your favorite Log !

$$\ln(5^{2x-1}) = \ln(6^{x-2})$$

$$(2x-1)\ln(5) = (x-2)\ln(6)$$

$$2x\ln(5) - x\ln(6) = \ln(5) - 2\ln(6)$$

$$\boxed{x = \frac{\ln(5) - 2\ln(6)}{2\ln(5) - \ln(6)}} \approx -1.3833$$