PreCalculus Name: Period: Date:

Warm Up 11/17

Lesson 4-4: Exponential and Logarithmic Equations

Objective
Students will…

- Be able to apply the inverse relationship between exponential and logarithmic functions and solve their equations algebraically.

Solving Exponential and Logarithmic Equations
So far in this chapter, we've learned various components and techniques involving exponential and logarithmic functions. Knowing about these characteristics and techniques can be useful when it comes to solving equations.
An **_________________________ equation** is one in which the variable occurs in the exponent. For example,

$$2^x = 7.$$

A **________________________ equation** is one in which a logarithm of the variable occurs. For example,

$$log_2(x+2) = 5$$

Although solving these equations may appear to be difficult, if we simply use their inverse relationship, they become quite easy.

Inverses
Recall that exponential and logarithmic functions are inverses of each other. Just the way we solve any algebraic equations, our goal is to solve for that particular variable (i.e. isolate the variable) by taking various inverses.

Ex. $2x - 6 = 6$

To "undo" the subtraction, we added. To "undo" multiplication, we divided. This worked, of course, because they are inverses to each other. We would need to do something similar. To "undo" the exponential, we need to use logarithms. Vice-versa, to "undo" logarithms, we take the exponential.

Examples

1. $3^{x+2} = 7$

2. $3^{x+3} = 5$

3. $8e^{2x} = 20$

4. $10^{56x} = 7$

5. $log_2(x+2) = 5$

6. $\ln x = 8$

7. $log_2(25 - x) = 3$

8. $log_2(22 - x) = 3$

9. $\log(x+2) + \log(x-1) = 1$

10. $3xe^x + x^2e^x = 0$

10. $e^{2x} - e^x - 6 = 0$

Homework 11/17
TB pg. 366-367 #1-13(e.o.o), 25, 31, 35, 39, 43, 49