Math 3 **6.3 Equations without Logs** Unit 6

*SWBAT solve equations initially without logarithms by using either similar bases or the properties of logs.*

**Solving equations with NO logs!**

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| **Method 1:** Similar Bases  (Note: Does not work for every problem) |
| **Step 1:** Isolate the Base  **Step 2:** Write both sides of the equation as an exponential with like bases.  **Step 3:** Set exponents equal to each other.  **Step 4:** Solve for the unknown. |

**Example 1:** 22x + 1 = 32x

**Example 2:** -5 + 53x – 9 = 120

**Example3:** Solve for x:

**You Try!** Solve for x:

Why would you need to use a log? Because the variable is in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and logs bring them down!!

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| **Method 2:** Properties of Logs |
| **Step 1:** Make sure the piece with the unknown exponent is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on one side.  **Step 2:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the logarithm to each side.  **Step 3:** Use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to bring down the exponent and solve! |

**Example 1:** Solve for x:

**You Try!** Solve for x:

**Example 2:** Solve for x:

**You Try!** Solve for x:

The Many Ways to Solve a Logarithmic Equation

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| One Log | **SWOOSH!**  Use when a variable is attached to the logarithm. | Solve for x: log4(4x – 2) = 3 |
| **Change of Base**  Use when the variable is not attached to the logarithm. | Solve for x: log245 = x |
| Two Logs | **Cancel the logs!**  Do this if and only if there is one log per side. | Solve for x: log6 x = log6 2x – 2 |
| **Condense the logs**  So that only one log appears per side. Then, decide whether to cancel, swoosh, or use change of base. | Solve for x: |
| No Logs | **Add a Log!**  Use this if you cannot get similar bases. | Solve for x: |
| **Similar Bases!**  Break each base down so that they are the same, cancel the bases, and work only with the exponents! | Solve for x: |

**Practice:** Complete the following problems for extra practice using the above rules for solving logarithms.

1. 2log4x = 12
2. Log 5x – log 7 = 2
3. log515 = 3x