GUIDED NOTES – 6.6 EXPONENTIAL AND LOGARITHMIC EQUATIONS

LEARNING OBJECTIVES

In this section, you will:

- Use like bases to solve exponential equations.
- Use logarithms to solve exponential equations.
- Use the definition of a logarithm to solve logarithmic equations.
- Use the one-to-one property of logarithms to solve logarithmic equations.
- Solve applied problems involving exponential and logarithmic equations.

USING LIKE BASES TO SOLVE EXPONENTIAL EQUATIONS

- Write out the 3 step process for solving for an unknown, given an exponential equation with the form $b^S = b^T$, where S and T are algebraic expressions with an unknown.

    1.

    2.

    3.

    Try It: Read Example 1 in the text, then answer the following.

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

Homework: *You should now be ready to attempt problem 1 in "Homework – Section 6.6" on WeBWorK.*

- Write out the 4 step process for using the one-to-one property to solve it, given an exponential equation with unlike bases.

    1.

    2.

    3.

    4.

Try It: Read Example 3 in the text, then answer the following.

Solve $5^x = \sqrt{5}$.

Try It: Read Example 4 in the text, then answer the following.

Solve $2^x = -100$.

Homework: *You should now be ready to attempt problems 4-6 in "Homework – Section 6.6" on WeBWorK.*

<u>SOLVING EXPONENTIAL EQUATIONS USING LOGARITHMS</u>

- Write out the 2 step process for solving for an unknown, given an exponential equation in which a common base cannot be found.

    1.

        a.

        b.

    2.

- Write out the 3 step process for solving for t, given an equation if the form $y = Ae^{kt}$.

    1.

    2.

    3.

Try It: Read Example 6 in the text, then answer the following.

Solve $3e^{0.5t} = 11$.

USING THE DEFINITION OF A LOGARITHM TO SOLVE LOGARITHMIC EQUATIONS

Study the box in your textbook section titled "using the definition of a logarithm to solve logarithmic equations."

- For any algebraic expression S and real numbers b and c, where $b > 0, b \neq 1$,

$$\log_b(S) = \underline{\quad} \text{ if and only if } b^c = \underline{\quad}$$

Try It: Read Example 10 in the text, then answer the following.

Solve $2\ln(x + 1) = 10$.

Homework: *You should now be ready to attempt problem 10 in "Homework – Section 6.6" on WeBWorK.*

USING THE ONE-TO-ONE PROPERTY OF LOGARITHMS TO SOLVE LOGARITHMIC EQUATIONS

Study the box in your textbook section titled "using the one-to-one property of logarithms to solve logarithmic equations".

- For any algebraic expression S and any positive real number b, where $b \neq 1$,

$$\log_b(S) = \underline{\qquad} \text{ if and only if } S = \underline{\qquad}$$

- Write out the 3 step process for solving an equation using the one-to-one property, given an equation containing logarithms.

1.

2.

3.

Try It: Read Example 12 in the text, then answer the following.

Solve $\ln(x^2) = \ln(1)$.