



Math Virtual Learning

Algebra IIB

April 17th, 2020



Lesson: April 17th, 2020

Objective/Learning Target:

Continue Solving Logarithmic Equations

Bell Ringer

Do just the first step for each of these logarithmic equations.

1. $\log_3(x^2 + 3x) = \log_3(-3x - 8)$

2. $\log(-x + 20) = \log(x^2 + 7x)$

Bell Ringer Answer

Using the idea from the previous lesson, because there's logarithms on both sides with the same bases then the expressions have to be equal. Here are the answers for the first step of each problem. Remember, this is just the first step, not the answer to the equations.

1. $x^2 + 3x = -3x - 8$

2. $-x + 20 = x^2 + 7x$

Lesson

Notice, in the previous lesson you were left with a linear equation after the first step. Looking at the warmup, you are not left with a linear equation, but a quadratic equation. Let's take some time and review over solving a quadratic equation. I will review over the method called factoring but don't forget, there are other methods.

Review: Solving a Quadratic

Let's take the first warm up problem and continue with it

$$\log_3(x^2 + 3x) = \log_3(-3x - 8)$$

$$x^2 + 3x = -3x - 8$$

$x^2 + 6x + 8 = 0$ Add $3x$ to both sides and add 8 to both sides. This is to get 0 on one side.

$(x + 4)(x + 2) = 0$ Factor the trinomial.

$x + 4 = 0$ and $x + 2 = 0$ Set each binomial equal to zero.

$x = -4$ and $x = -2$ Solve each linear equation.

Practice:

$$11) \log_{12} (v^2 + 35) = \log_{12} (-12v - 1)$$

$$12) \log_9 (-11x + 2) = \log_9 (x^2 + 30)$$

$$13) \log (16 + 2b) = \log (b^2 - 4b)$$

Answers to Practice

$$11) \log_{12} (v^2 + 35) = \log_{12} (-12v - 1)$$

$\{-6\}$

$$12) \log_9 (-11x + 2) = \log_9 (x^2 + 30)$$

$\{-7, -4\}$

$$13) \log (16 + 2b) = \log (b^2 - 4b)$$

$\{8, -2\}$

Additional Resources

Here is an additional [video](#) where two problems are being done that are very similar to the practice problems above

Lesson Part 2

Now let's look at solving logarithmic equations where you can't use equal expressions. Here is a great [video](#) going over this. Watch the 4 example problems then try the next practice on your own.

Practice Part 2

6) $2\log_7 -2r = 0$

7) $-10 + \log_3 (n + 3) = -10$

8) $-2\log_5 7x = 2$

9) $\log -m + 2 = 4$

10) $-6\log_3 (x - 3) = -24$

Answers

6) $2\log_7 -2r = 0$

$$\left\{-\frac{1}{2}\right\}$$

7) $-10 + \log_3 (n + 3) = -10$

$$\{-2\}$$

8) $-2\log_5 7x = 2$

$$\left\{\frac{1}{35}\right\}$$

9) $\log -m + 2 = 4$

$$\{-100\}$$

10) $-6\log_3 (x - 3) = -24$

$$\{84\}$$