



Math Virtual Learning

# College Prep Algebra

April 17, 2020



College Prep Algebra  
Lesson: April 16, 2020

**Objective/Learning Target:**

How to solve exponential equations without logarithms

**Let's Get Started:**

**Did you ever realize you could write 64 as three different  
exponentials?  $64 = 8^2 = 4^3 = 2^6$**

**Lesson:**

**Recognizing that numbers like 64 can be represented by exponentials is key to solving exponential equations if you don't want to use logarithms.**

**So to solve an equation like  $\left(\frac{1}{2}\right)^{4x} = 16$**

**we need to figure out if 16 can be rewritten as an exponential.**

**Watch this [VIDEO](#) to see how to solve without logs, then we'll solve this equation on the next slide**

Lesson: Here is the link for the calculator in the video.

## Scientific Calculator

$$\left(\frac{1}{2}\right)^{4x} = 16$$

$$(2^{-1})^{4x} = 2^4$$

$$2^{-1 \cdot 4x} = 2^4$$

Now all I need is to make the Powers equal, and then solve for x.

$$-1 \cdot 4x = 4$$

$$-4x = 4$$

$$\frac{-4x}{-4} = \frac{4}{-4}$$

$$x = -1$$

What exponential can 16 be written as?

$$16 = 4 \cdot 4 = 2 \cdot 2 \cdot 2 \cdot 2 = 2^4$$

Oh dear. I need  $\frac{1}{2}$  to be written as a power of 2. I will need to use a logarithm here.

$$\frac{1}{2} = ? \rightarrow \log_2 \left(\frac{1}{2}\right) = -1$$

$$\frac{1}{2} = 2^{-1}$$



Change  
Of  
Base

$$\frac{\log\left(\frac{1}{2}\right)}{\log(2)} = -1$$

## Practice:

To practice solving exponential equations with logarithms, use the worksheet link and the scientific calculator link below.

[Solving Exponential Equations without logs AND Answer Key](#)

[Scientific Calculator](#)

# Additional Practice

[Khan Academy Online Practice Problems](#)

[IXL free online practice:](#)  
YOU NEED THE  
CALCULATOR