

EXPONENTIAL EQUATIONS

Exponential equations are fairly easy to solve. We need to get the bases the same and once that is accomplished, we can set the exponents equal to each other to solve the equation.

Let's look at a simple example of an exponential equation.

$$2^x = 64$$

We want to rewrite 64 with a base of 2. That would make our new equation:

$$2^x = 2^6$$

Since both bases equal each other, we set the exponents equal to each other to solve the problem.

$$2^x = 2^6$$

$$x = 6$$

Examples:

$$9^x = \frac{1}{3}$$

$$3^{2x} = 3^{-1}$$

$$2x = -1$$

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

The first thing to do is to get the bases the same. Notice the new exponents. Now we set the exponents equal to each other and solve.

$$27^{2a-1} = 9$$

$$3^{3(2a-1)} = 3^2$$

$$3^{6a-3} = 3^2$$

$$6a - 3 = 2$$

$$6a = 5$$

$$a = \frac{5}{6}$$

It is that simple!

Problems for you to try. The answers are provided at the bottom of the page, but don't look before you try them.:

1. $5^x = 5^3$

2. $10^4 = 10^{1-x}$

3. $4^{x+1} = \frac{1}{64}$

1. $x = 3$

2. $x = -3$

3. $x = -4$