# Exponential equations not requiring logarithms answers with work

An exponential equation involves an unknown variable in the exponent. In this lesson, we will focus on exponential equations that do not require the use of logarithm. In algebra, this topic is also called solved exponentially equations with the same basis. Why? The reason is that we can solve the equation by forcing both sides of the exponential equation to have the same basis. Key steps in Solving Exponential Equations without Logarithm makes the base on both sides of the same equation so that if \big {b{color{{color{blue}M}}={b^{color{red}}then{color{blue}M}{{red{N} in other words, if you can express exponential equations to have the same basis on both sides , then it is okay to put their power or outlining equal to each other. You should also remember the properties in exponent in order to be resolved exponentially. Basic Properties of Exponent 1) Zero Properties 2) Negative Display Properties 3) Product Rule 4) Quotient Rule 5) Power off a Power Rule Let's take a look at some examples! Examples of Ways to Solve Exponential Equations without Sample Logaritms 1: Solve the exponential equation below using the basic properties of Exponent. Workaround: Express the denominator to the right with a base of 5. We have 125 = {5^3}. Apply the negative exponent property. At this point, bases are the same therefore placing their powers equal to each other. This is just a simple linear equation a simple. To resolve to x, divide both sides by 3. That's it! The final answer here is x = 1. Example 2: Solve the exponential equation below using the Basic Properties of Exponents. Workaround: Express all numbers with the base of 2. So we have: 8 = {2^3} and 256 = {2^8}. Apply the product rule on the left, while using the Power of a Power Rule on the right. Here we are ready to put their powers equal to each other since we are able to create single base that is the same on both sides. Solve the simple linear equation. Subtract both sides by 7x isolated x. Cox! The final answer is x = 3. Example 3: Solve the exponential equation below using the Basic Properties of Exponents. Workaround: Express each number with a base 2. In doing so ... 64 = {2^6} and 16 = {2^4 } Apply power to a power rule. In other words, multiply the inner exponent of the outward exponent. Do it for both the numerator and denominator. Subtract the top exponent by the bottom exponent. This is how it looks after subtracting the exponent. Now looking at the right, can we express 1 as an exponential number with base 2? The answer is yes! We can write it as 1 = {2^0} using the Zero property of Exponent. Now we have the set-up that we want - there are the same bases on both sides. Place the left-hand exponent of the equation equal to exponent in the right hand side, then solve the equation for x in To resolve start by adding both sides by 12 to move constants to the right. Finally, divide both sides by 4 to get the value of x. The final answer is x = 3. Example 4: Solve the exponential equation below. Solution: Start by writing the equation to solve. Express each fraction as an exponential number with a base 6. 36={6^2}6={6^16}216={6^3}\Broad{left({1\on{{6^2}^right^^3 - }{left({1\ on {{6^1}\right)^x}= {6^3} Apply the Negative Exponent Properties to the left of the equation. Multiply the inner exponent to outward exponent using the power of a power rule. Since they have a common basis, add the exponents using the Generated Rule. Obviously that no one with the same base on both sides, we can now put every power equal to each other. Solve the linear equation by adding both sides by 6 to get x = 9. So the solution is x = 9. Example 5: Solve the exponential equation below using the Basic Properties of Exponents. Workaround: Use 3 as the common basis. 9= {3^2} and 27 = {3^3} Multiply the inner and outside exhibitors by applying the power of a power rule. At this point, we can add the exponents on the left side of the equation because they now have common grounds. Apply the product rule by adding the exponents when bases are equal. Clearly, we can put their powers on both sides of the equation equal to each other. That results in a multi-stage simple equation. So we add 6x first on both sides. Then subtract by 4. And finally, divided by – 1 completely isolated x alone! The answer is x = 7. Easy! Example 6: Solve the exponential equation below using the Basic Properties of Exponents. Workaround: Express each number with a base 2. And multiply the inner exponents of outward exponent by using the power of a Power Rule. To generate a single base on the left, use the Product rule – copy the common base 2 and add the exponents. This is when we apply the Product Rule. After the addition of exhibitors, we have single base on each side. It's time to put their power equal to each other. After the power equations, we reach this quadratic equation. We need to move all terms on one side while forcing the opposite side to equal to zero. Resolve the quadratic equation by using the Factor method. Factor out 5% of the trinomial then factor out the simple trinomial as a product of two binomials. Using the Zero property, we get the following values for x. The correct answers are x = 2 and x = - 1. Example 7: Solve the exponential equation below using the Basic Properties of Exponents. Workaround: Express each number as the exponential number with a base 7. Apply negative Exponent Properties on the left. Also, the square root symbol can be recruited as the exponent of \major {1\ on 2}. Apply the Power of a Power Rule to the left. the left side and a single base using the product rule do not copy the common basis to add exhibitors. We can now put their powers equal to each other, then resolve. To resolve to x, subtract both sides by 2. To finish this off, divide both sides by 12. The final solution is x = - {\large{1\more than 8}}. Example 8: Solve the exponential equation below using the Basic Properties of Exponents. Workaround: Express the numbers using the base 5. And multiply the interior and exhibitors exhibiting using the power of a power settlement. It seems that we can use the Quotient Rule because we have the same bases on the numerator and denominator. Subtract the exponent on the numerator by the exponent of the denominator. It's okay now to put the powers or exhibitors equal to each other and then solve the quadratic equation. Solve the quadratic equation by the trinomial factor of two binomials. Then set each binomial equal to 0 to resolve for x. Using the Zero property, we get the following values in x. Final answers are x = - 3 and x = 2. You might also like: Solve Exponential Equations using Practice Logaritms and Sheet If you are seeing this message, it means we have problems loading external resources on our website. If you are behind a web filter, please make sure that the *.kastatic.org and *.kasandbox.org are unblocked. This Algebra 2 Exponential Equation does not require Worksheet Logaritms will give you exponential equations to solve. You can select the number of issues you want and the shape of the problems. Click here for more Algebra 2 - Exponential and Logarithmic Worksheets