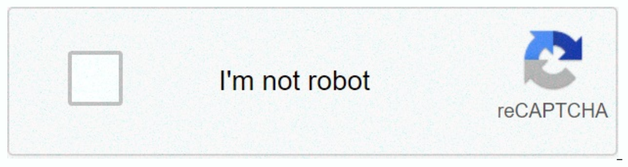

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What is an extraneous solution to a rational equation

Solve Rational Equation Learning Goal(s) · Resolve rational equations by using the techniques to simplify and manipulate rational expressions. Derived containing rational expressions is called rational derived. We can solve these equations by using the techniques for performing operations with rational expressions and for solving algebraic equations. Solve Rational Equation by using Common Denominators A method to solve rational equations is to recruit the rational expressions in terms of a common denominator. Then, since we know the numerator is equal, we can settle for the variable. To illustrate this, let's look at a very simple equation: x =3 Since the denominator of each expression is the same, the numerator must be equivalent as well. This means that x = 3. This is true for rational equations and polynomials too: 2x - 5 = 11 x = 8 Again, since the denominators are the same, we know the numerator must also be equal. So we can set them equal to each other and settle for x. We should check our solution in the original rational expression: The solution checks, and since x=8 does not result in division by 0, the solution is valid. When the terms of a rational equation have unlike denominator, solving the equation will involve some extra work. Here's an example: Example Problem solving the equation No value is excluded because the denominators are both constants. Find a common denominator and recruit each expression with that denominator. The common denominator is 8. x+2 = 6 x = 4 Since the denominator is the same, the numerator must be equal for the equation to be true. Settle for x. Check the solution by replacing 4 for x of the original equation. Answer x = 4 Another way to solve rational equation is to multiply both sides of the equation by the common denominator. This eliminates the denominator and turns the rational equation into a polynomial equation. Here is the same equation we just solved: Example Problems solve the equation No value is excluded because the denominators are both constant. Multiply both sides by smaller the common denominator x + 2 = 6 Simplified x + 2 – 2 = 6 – 2 x = 4 Resolved for x Answer x = 4 Now that we understand the techniques, let's look at an example that has variables in the denominator too. Remember that every time there are variables in the denominator, we need to find any values that are excluded from the domain because they would make the denominator zero. To solve this equation, we can multiply both sides by the common denominator: Example Problem Solve x + 2 = 0 x = -2 x - 2 = 0 x = 0 x = 2 (x + 2) (x - 2) = 0 x = 2, 2 First determine the excluded values. These are the values of x that result in a 0 denominator. denominator: x + 2 x - 2 x2 - 4 = (x - 2) (x + 2) least common denominator: (x - 2) (x + 2) Find the common x – 2, x + 2, and x2 - 4 since (x - 2) and (x + 2) are both factors in x2 - 4, the common denominator is (x - 2) (x + 2) or x2 - 4 Multiply both sides of the equation by the common denominator. 7x - 14 + 5x + 10 = 10x - 2 12x - 4 = 10x - 2 Simplified 12x - 10x - 4 = 10x - 10 x - 2 2x - 4 = -2 2x - 4 + 4 = -2 + 4 2x = 2 x = 1 Solve for x Check to make sure that the solution is not an excluded value. (It's not.) Check the solution of the original equation. Answer x = 1 Solve the equation, I 0 or 2 A) i = 2 B) there is no solution C) i = 8 Show/Hide Answer A) Correct. You probably found the common denominator correctly, but forget to distribute when you were simplified. You also forget to check your solution or note the excluded values; i ≠ 2 because it makes the expression on the right defined. Multiply both sides by the common denominator to provide, so forth. The correct answer is i = 8. B) Correct. for sure. The solution, 8, is not an excluded value. The correct answer is i = 8. C) Corrected. Multiply both sides of the equation by the common denominator provided, so. . The correct answer is i = 8. We've seen that there is more than one way to solve rational equations. Because both of these techniques are manipulated with term recruits, sometimes they can produce solutions that don't work in the original form of the equation. These kinds of answers are called extrant solutions. These solutions are matters in the resolved process and are not real answers at all. That's why we should always check solutions in the original equations – we can find that they yield true statements or produce undefined expressions. Solve the equation: A) x = -1 B) x = -1, 6 C) x = -4, 3 D) There is no solution Show / Hide Response A) Correct. ; ; x – 2 + x2 – 6x = 4; (x – 6) (x + 1) = 0. Since 6 is an excluded value, it is an extrane solution. Only -1 is a real solution. B) Correct. 6 is a value excluded because it makes the denominator the first rational expression equal to 0. Since 6 is an extrant solution, it cannot be included in the solution. The correct answer is -1. C) Correct. The common denominator is (x - 6) (x -2). Each theme on the left must be multiplyed by a fraction equivalent to 1 that will produce that denominator:=. The correct answer is -1. D) Incorrect. When the equation is solved by finding the common denominator, the answers are -1 and 6. It is true that 6 is an excluded value and thus an extrane solution that must be thrown. But -1 works in the original equation and is a valid solution. The correct answer is -1. We solve rational equations by finding a common denominator. We can then follow either of two methods. We can rewrite the equation so that all terms have the common denominator and we can settle for the variable with just the numerator. Or we can multiply both sides by the common denominator so that all terms become polinomal instead of rational expressions. An important step in resolving rational equations is to reject any extinguishing solution from the final response. Extrane solutions are solutions that do not meet the original form of the equation because they produce true statements or to exclude values that make a denominator equal to 0. Learning Goals (8.4.1) – Solve rational equations by clearing denominator to identify extrant solutions in a rational equation containing rational expressions called rational equations. For example, [latex]\showstyle\frac{2x+1}{4}=\frac{7}{x}[/latex] is a rational derived. Rational equations can be useful for representing real-life situations and getting answers to real problems. In particular, they are quite good to describe a variety of proportional relationships. One of the simplest ways to solve a rational equation is to eliminate denominator and the common denominator, then use properties of equality to isolate the variable. This method is often used to solve linear equations involving fractions as in this example: Solve [latex]\showstyle\frak{2}{3}x-\frak{5}{6}=\frak{3}{4}[/latex] by clearing the fractions of the initial equation. [latex]\begin{eqnarray*}\frac{2}{3}\,x -\frac{5}{6}\,=\frac{3}{4}\,&&\text{Multiply}\,\text{each}\text{term}\,\text{by}\,\text{LCD}, 12\\&&\frac{2(12)}{3}\,x -\frac{5(12)}{6}\,=\frac{3(12)}{4}\,&& \text{ Reduce}\,\text{ fractions}\&&\\\2(4) x - 5 (2) = 3(3)&&\text{ Multiply}\\8 x - 10 = 9 & &\text{ Solve}\underline{+10+10}\,&&\text{Add}\,10\text{to}\,\text{both}\text{ southeast}\8 x=19&&\text{Divide}\,\text{both}\,\text{sides}\,\,\{sides}\,\text{sides}\,\ \text{by}\,8\overline{8}\,\overline{8}\,&&\\x=\frac{19}{8}\,&&\text{ Our}\,\text{ Solution}\end{eqnarray*}[/earthx] See have the common denominator and worked with with fractions , but that often leads to more mistakes. We can apply the same idea to solve the rational equations. The difference between a linear equation and a rational equation is that rational equations can contain polinomal in the numerator and denominator of the fractions. This means that clearing the denominator can sometimes mean multiplying the rational equation all by a polynomial. In the next example, we will clear the denominator of a rational equation with a theme with a polynomial of the numerator. In the next two examples, we show how to resolve a rational equation with a binomial in the denominator of one theme. We will use the common denominator to eliminate the denominator from both fractions. Note that the LCD is the product of both denominator because they don't share any common factors. In the video that follow us introduce two ways to solve rational equations with both integers variable denominator. Some rational expressions have a variable in the denominator. Then this is the case, there is an extra step in solving them. Since division by 0 is undefined, you must exclude the variable value that would result in a denominator of 0. These values are named excluded values. Let's look at an example. In this video we introduce an example to resolve a rational equation and variable in the denominator. You've seen that there is more than one way to solve rational equations. Because both of these techniques are manipulated with term recruits, sometimes they can produce solutions that don't work in the original form of the equation. These kinds of answers are called extrant solutions. That's why it is always important to check all solutions in the original equations – you may find that they yield true statements or produce undefined expressions. Sometimes, solve a rational derived result of a quadratic. When this happens, we continue the solution by simplifying the quadratic equation by one of the methods we've seen. It can turn out that there is no solution. Solve the following rational equations: [latex]\montrestyle\frac{-4x}{x-1}+\frac{4}{x+1}=frac{-8}{x}^{2}-1}[/latex]. Solve [latex]\showstyle\frac{3x+2}{x-2}+frac{1}{x}=frac{-2}{x}^{2}-2x}[/latex]. 2}+\frac{1} {x}=\frac{-2}{x}^{2}-2x}[/latex].

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