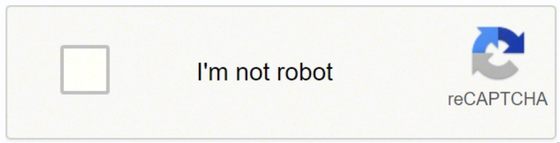

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Solving rational equations algebra 1 worksheet

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Simplifying Rational Expressions

Simplify each expression.

1) $\frac{20d^{7}}{70d^{2}}$

2) $\frac{27h^{9}}{36h^{4}}$

3) $\frac{24c^{8}}{36c^{4}}$

4) $\frac{24}{3x - 24}$

5) $\frac{4p + 36}{20}$

6) $\frac{6r - 36}{r - 6}$

7) $\frac{s + 8}{2s + 16}$

8) $\frac{n + 3}{n^2 + 4n + 3}$

9) $\frac{z^2 - 8z + 15}{z - 5}$

10) $\frac{g^2 - 2g - 24}{g^2 - g - 20}$

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Multiplying and Dividing Rational Expressions

Simplify each expression.

1) $\frac{5n + 5}{n^2 + 10n + 16} \times \frac{n + 8}{5n + 5}$

2) $\frac{8}{11} \div \frac{2}{55}$

3) $\frac{r^2 + 20r + 96}{r^2 + 14r + 24} \div \frac{1}{r + 2}$

4) $\frac{10g^2 - 35g - 20}{10g^2 - 25g - 15} \times \frac{g^2}{10g^2 - 50g - 60}$

6) $\frac{4d^2}{4} \times \frac{114}{2}$

7) $\frac{6n - 42}{n - 6} \div \frac{3n}{6n - 22}$

8) $\frac{10}{(n + 4)} \times \frac{10n - 77}{(n - 7)}$

9) $(z - 3)(-\frac{72}{z^2 + z - 3})$

Rational Equations: Solving

Solve for the variable

1) $\frac{3}{x} + \frac{1}{4} = \frac{8}{x}$

2) $\frac{x}{4} = \frac{6}{3}$

3) $\frac{2}{x-2} = \frac{5}{x-1}$

4) $\frac{4}{w-2} + \frac{3}{w+2} = \frac{16}{w^2-4}$

5) $\frac{x}{5} = \frac{3}{x-2}$

6) $\frac{x}{2} = \frac{-7}{5-x}$

7) $\frac{2y}{2} = \frac{-4}{y+4}$

8) $\frac{2}{2t-3} = \frac{3}{3-2t}$

9) $\frac{5x}{10x+5} - 4 = \frac{3x-1}{2x+1}$

10) $\frac{3}{5m} = \frac{m+3}{7m}$

Solving Rational Equalities/Equations

Method 1: Combine terms (using least common denominator)

Example: $\frac{x}{2} + \frac{x}{5} = 14$ (Combine terms on left)

$\frac{5x}{10} + \frac{2x}{10} = 14$ Find least common multiple of 2 and 5

$\frac{7x}{10} = 14$ (Solve)

$7x = 140$

$x = 20$

Check solution: $\frac{20}{2} + \frac{20}{5} = 14$

$10 + 4 = 14$ ✓

Method 2: Multiply entire equation by least common denominator

Example: $\frac{5n}{2} + \frac{1}{4} = 4$ (multiply entire equation by LCD to get rid of the fractions)

$4 \cdot \left(\frac{5n}{2} + \frac{1}{4} = 4 \right)$ Denominators are 2, 4, and 1... LCM of 1, 2 and 4 is 4...

$10n + 1 = 16$ Solve

$10n = 15$

$n = \frac{3}{2}$

Check solution: $\frac{5 \cdot \frac{3}{2}}{2} + \frac{1}{4} = 4$

$\frac{\frac{15}{2}}{2} + \frac{1}{4} = 4$

$\frac{15}{4} + \frac{1}{4} = 4$ ✓

2 rational expressions in an equality? Try cross multiplying...

Example: $\frac{1}{x^2 + 1} = \frac{3}{2x + 4}$

$(2x + 4)(1) = (3)(x^2 + 1)$

$2x + 4 = 3x^2 + 3$

$0 = 3x^2 - 2x - 1$

$(3x + 1)(x - 1) = 0$

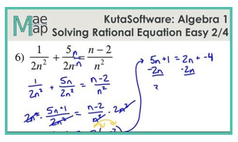
$x = -1/3$ or 1

Check solutions: $\frac{1}{(1)^2 + 1} = \frac{3}{2(1) + 4}$

$\frac{1}{2} = \frac{3}{6}$ ✓

$\frac{1}{(-1/3)^2 + 1} = \frac{3}{2(-1/3) + 4}$

$\frac{1}{\frac{10}{9}} = \frac{3}{\frac{-2}{3} + \frac{12}{3}} = \frac{9}{10}$ ✓



Solving rational equations worksheet algebra 1.

Kuta Software 169; 2021 Kuta Software. All rights reserved. A rational equation is a type of equation in which it involves at least one rational expression, a fancy 160; name for a194; 160fraction. The best approach to dealing with this type of equation is to eliminate all denominators using the idea of LCD (common minimum denominator). In this way, the 160; the residua l equation to be addressed is usually linear194; 160th square. In this lesson, I want to pass over ten (10) examples of work with various levels of difficulty. I believe that most of us learn mathematics by looking at many examples. Here we go! Examples How to solve rational equations Example 1: Solve the rational equation Below 160; and make sure to check the answers for foreign values. Would it be nice if there were no denominators? Well, they simply disappear without any valid algebraic step. The approach is to find the Less Common Denominator (also known as Less Multiple) and to use this to multiply both sides of the rational equation. It results in the removal of denominators, leaving us with regular equations that we already know how to solve as linear and quadrant. This is the essence of the resolution of rational equations. LCD is six. It will double both sides of the rational equation with 6x to eliminate denominators. That is our goal, however, to make our lives much easier. You should have something like that after you distribute the LCD. I've decided to keep the x variable on the right side. Then remove the -5x on the left by adding both sides with 5x. Simplify. It is now clear how to solve this one-step equation. Divide both sides with the coefficient of 5x. Yes! The final answer is x = 2 after having rechecked it in the original rational equation. It'194? 160? provides a true statement. Always check your own Solved answer is to return to the original equation to exclude foreign solutions. This is a critical aspect of the global approach to issues such as rational equations and radical equations. Radicals. 2: Solve the rational equation BelowÃ¨ and make sure to check your answers for extraneous values. The first step in solving a rational equation is always to find the Ã¢ÂÂÂÂÂÂÂ known as LCD. So for this problem, finding the LCD is easy. There you go. Try to express each denominator as unique powers of prime numbers, variable is 160; and/or terms. Multiply those with the highest exponents by each single, variable prime number and/or terms to get the required LCD. The LCD is 9x. Distribute it to both sides of the equation to eliminate the denominators. To keep the variables on the left side, subtract both sides from 63. The resulting equation is just a one-step equation. Divide both sides with the coefficient of x. Check the value x = -39 again in the main rational equation and it should convince you that it works. Example 3: Solve the rational equation BelowÃ¨ and make sure to check your answers for extraneous values. Looks like the LCD's already been given. We have a single common term left ({x – 3} right) for both denominators. Number 9 has the trivial denominator of 1, so I'm going to ignore it. Therefore the LCD must be left ({x – 3} right). The LCD which is left ({x – 3} right). Use it as a multiplier for both sides of the rational equation. I hope you have this linear equation after you make some deletions. Distribute the constant 9 in left ({x – 3} right). Combine the constants on the left side of the equation. Move all numbers to the right side by adding 21 to both sides. Not bad. Once again he makes the habit of checking the solved answer from the original equation. It should work so yes, x = 2 is the final answer. Example 4: Solve the rational equation BelowÃ¨ and make sure to check your answers for extraneous values. I hope you can tell now what the LCD is for this problem via inspection. Otherwise, you226; 128;Â Good. Continue to examine some examples and you will be more sensible as you proceed. Test Test express each denominator as unique powers of prime, variable (194; 160; and/or terms. Multiply those with the highest exponents by each single, variable prime number and/or terms to get the required LCD. The LCD is 4left ({x +2} right). Multiply each side of the equations with it. After careful 160; the distribution of the LCD in the rational equation, I hope you also have this linear equation. Quick Note: If you ever got to you226; they are compared with leftovers in the denominator after multiplication, this means you have a wrong LCD. Distribute the constants in brackets on both sides. Join the constants on the left side to simplify. At this point, make the decision where to keep the variable. Keeping the x on the left means subtracting both sides with 4. That's sex. Check your answer for validity. Example 5: Solve the rational equation below194; and be sure to check your answers for extraneous values. Focusing on denominators, the LCD should be 6x. Why? Remember, multiply together with the main numbers or variables with the highest powers. The LCD is 6x. Distribute to both sides of the given rational equation. It should look like after a careful deletion of such terms. Distribute the constant in the parentheses. The variable x can be combined on the left side of the equation. Since the variable x is there;128;s only one constant left, it will keep the variable x on the opposite side. So I subtract both sides with 5x. Divide both sides by -2 to isolate x. We have the final answer. Example 6: Solve the rational equation BelowÃ¨ and make sure to check your answers for extraneous values. Whenever you see a trinomial in the denominator, always factor it out to identify the unique terms. By simple factoring, I found that {x^2} +4x – 5 = left ({x + {5}} right) left ({x – 1} Not bad? Find LCD just like in previous problems. Try to express each denominator as unique powers of first, variable numbers 160; and/or and/or In this case, we have terms in the form of binomial. Multiply together with those with the highest exponents for each unique copy of a first, variable number and/or terms to get the required LCD feature. Before distributing the LCD display in rational equations, make the denominators completely. This helps in the cancellations of commons terms later. Multiply each side from the LCD. Oh! It's amazing how quickly the original problem was cleaned up. Get rid of the brackets from the distribution property. You should end up with a very simple equation to solve. Example 7: Fix the underlying rational equation and make sure you check the answers for foreign values. Since the denominators are two unique binomials, it makes sense that the LCD display is only their product. The LCD display is \ LEFT ({X + 5} \ Right) \ LEFT ({X - 5} \ Right). Distribute it in rational equation. It translates into a product of two binomials on both sides of the equation. It makes a lot of sense to run the sheet method. Does that sound like a bell? I expanded both sides of the equation using the sheet. You should have a similar configuration to this point. Now it combines similar terms (x) on both sides of the equation. What is wonderful about this is that the square terms are exactly the same! They're supposed to cancel each other. We could have bumped into a problem if their signs are opposite. Subtract both sides of {x ^ 2}. The problem is reduced to a regular linear equation by a square. To isolate the X variable on the left side implies adding both sides of 6x. Move everything steady to the right. Finally, divide both sides of 5 and we're done. EXAMPLE 8: Solve the rational equation below ... and make sure you check the answers for foreign values. This seems a little inimidatory. But if we stick to the bases, how to correctly find the LCD display andcarefully the equation, we should realize that we can control this â¨¬ Âbeast" quite easily. Express each denominator as as The powers of the terms multiply each single conditioning with maximum power to get the LCD factor out of the denominators. Multiply both parts from the LCD display obtained above. Be careful now with your deletions. You should end up with something like this when you're done. Next step, distribute the constants in parentheses. This is getting simpler with every step! I would also like to use terms on both sides in order to simplify matters even further. This is just a multi-step equation with variables on both sides. Easy! To keep x on the left side, subtract both sides by 10x. Move all pure numbers to the right side. Subtract both sides from 15. A simple one-step equation. Divide both parts by 5 to get the final answer. Again, don't forget to return the value to the original equation to verify. EXAMPLE 9: Solve the rational equation below ... and be sure to check the answers for foreign values. Let's find the LCD display for this problem and use it to get rid of all denominators. Express each denominator as unique powers of terms. Multiply each unique term with maximum power to determine the LCD display. Factor out of denominators completely distributes the above LCD display in the given rational equation to eliminate all denominators. We've reduced the problem to a very simple linear equation. This is the â¨¬ magicâ¨ of using LCD. Multiply the constants in the parentheses. Keep the variable on the left side by subtracting x on both sides. Keep constant on the right. Add both sides of 8 to solve x. Done! EXAMPLE 10: Solve the underlying rational equation ... and be sure to check the answers for foreign values. Start by determining the LCD display. Express each denominator powers of unique terms. So multiply the expressions together with the high exponents for each single period in order to obtain the required dispensation. So, then we have, factor out of denominators completely. Distribute the above LCD display in the rational equation to eliminate all denominators. Distribute the constant in Critical step: We're dealing with a square equation. So keep everything (both variables and constants) on one side forcing the opposite side to zero. I can make the left side equal to zero by subtracting both sides of 3x. At this point, it is clear that we have a square equation to solve. Always start with the simplest method before trying anything else. I will use the x^2+bx+c=0 form factoring method as trinomy is easily factorable by inspection. Factors {x^2} - 5x + 4 = \left({x - 1} right)\left({x - 4} \right.) You can check the FOIL method. Use the Zero Product Properties to resolve x. Set each factor equal to zero, then solve each simple one-step equation. Once again, always check the answers resolved in the original equations to make sure they are valid. Practice with worksheets You may also be interested in: Add and subtract rational expressions Multiplying rational expressions Solving Rational Inequalities Inequalities Students develop understanding by solving equations and inequalities intuitively before formal solutions are introduced. Students begin their study of algebra in Books 1-4 using only integers. Books 5-7 introduce rational numbers and expressions. Books 8-10 extend coverage to the real number system. Solving Rational Equations. A rational equation is a type of equation where it involves at least one rational expression, a fancy name for a fraction. The best approach to address this type of equation is to eliminate all the denominators using the idea of LCD (least common denominator). By doing so, the leftover equation to deal with is ... These Algebra 1 Equations Worksheets will produce single variable equations to solve that have different solution types. You may select three different types of problems where there is no solutions, one solutions, or an infinite number of solutions. These worksheet will produce twelve problems per page. These Equations Worksheets are a good resource for students in the 7th ... Challenge 1 Challenge 2 Worksheet To Sum Up (Pun Intended!) ... Solving rational equations is just like solving any other equation once you complete this step. If it's a simple case, where you have one fraction being equal to one other fraction, you can cross multiply. Multiply both sides by the values of both denominators. In this example, both sides are multiplied by 3, then 5. ... 1-7 The Distributive Property 7-1 Zero and Negative Exponents 8-2 Multiplying and Factoring 10-2 Simplifying Radicals 11-3 Dividing Polynomials 12-7 Theoretical and Experimental Probability Absolute Value Equations and Inequalities Algebra 1 Games Algebra 1 Worksheets algebra review solving equations maze answers Cinco De Mayo Math Activity Class Activity Factoring ... 1-7 The Distributive Property 7-1 Zero and Negative Exponents 8-2 Multiplying and Factoring 10-2 Simplifying Radicals 11-3 Dividing Polynomials 12-7 Theoretical and Experimental Probability Absolute Value Equations and Inequalities Algebra 1 Games Algebra 1 Worksheets algebra review solving equations maze answers Cinco De Mayo Math Activity Class Activity Factoring ... Solving rational equations is similar to solving equations containing fractions, but with an extra step.This quiz and worksheet combo will test your ability to solve these equations. Quiz ...

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