Addition and subtracting rational expressions worksheet

This spreadsheet of rational expressions will cause problems adding and subtracting rational expressions. You can select the type of operator, as well as the types of denominators you want in each expression. Click here for More Algebra 1 – Rational Expressions Worksheets adding and remaining rational expressions – Practice Problems Move mouse over the Reply to reveal the answer or click the Full Solution link to reveal all the steps needed to add and subtract rational expressions. Rational expressions: Mathworksheetsgo.com is now part of Mathwarehouse.com. All your tiles are already here Mathwarehouse.com. Please update your bookmarks! Students will practice adding and other rational expressions with different denominators. Note: The worksheet on this page focuses on adding rational expressions with different names. We also have a separate spreadsheet when adding and subtracting rational expressions that have as denominators. Directions: Add or subtract the following rational expressions. Error : Please click Not a Robot, then try downloading again. This is a 4-part worksheet: Part I Model Problems Part II Practice Part III Challenge Problems Part IV Answer Key Rational Expressions How to Add and Subtract Rational Expressions Error: Click Not a Robot, then try downloading again. 6th, 7th, 8th, 9th, 10th, 11th, 12thPage 2 This Algebra 1 – Basics Worksheet will create problems for the student to add and subtract rational numbers. Click here for More Algebra 1 – Basic Worksheets Adding and Remaining Rational Expressions – Practice Problems Move mouse over the Reply to reveal the answer or click the Full Solution link to reveal all the steps needed to add and subtract rational expressions. Related topics: More lessons for algebra math spreadsheets A series of basic algebra lessons online free. In this lesson, we will learn how to multiply and divide rational expressions such as add and subtract rational expressions such as solving rational equations The following diagrams give the steps to multiply, divide, add and subtract rational expressions. Scroll down the page to see examples and solutions. Multiplying and dividing rational expressions Multiplying rational expressions is basically two simplifying problems together. By multiplying rational, factor both numerators and denominators and identify equivalents of one to cancel. Dividing rational expressions is the same as multiplying with an additional step: we take the reciprocal of the second fraction and change the division to multiplication. How to multiply and divide rational expressions. Displays examples of step-by-step solutions on how to multiply rational expressions when numerators and denominators are monomial. Show examples of step-by-step solutions how to multiply rational expressions. Displays examples of step-by-step solutions on how to split rational expressions. Show solutions step by step Adding and Rational expressions Add and subtract rational expressions is similar to adding fractions. When adding and subtracting rational expressions, we find a common denominator and then add the numerators. To find a common denominator, factor every first. This strategy is especially important when denominators are trinomial. How to add and subtract rational expression with and without similar denominators. Show step-by-step solutions Examples of how to add and subtract rational expressions with the same denominators. Show step-by-step solutions Examples of how to add and subtract rational expressions when denominators are different. Show step-by-step solutions Examples of how to add and subtract rational expressions when denominators are different. Show step-by-step solutions Try mathway's free calculator and problem solver below to practice various mathematical themes. Try certain examples or type your own problem and check your answer with step-by-step explanations. We welcome your comments, comments and questions about this site or page. Please send your comments or queries through our comments page. Adding and subtracting rational expressions is similar to adding and subtracting fractions. Remember that if the denominators are the same, we can add or subtract the numerators and write the result on the common denominator. When working with rational expressions, the common denominator will be a polynomial. In general, taking into account polynomials P, Q and R, where Q≠0, we have the following: In this section, suppose that all variable factors in the denominator are not zero. Example 1: Add: 3y + 7y. Solution: Add numerators 3 and 7, and type the result on the common denominator, y. Answer: 10y Example 2: Subtract: x −52x −1 −12x −1. Solution: Subtract the numerators x−5 and 1, and write the result on the common denominator, 2x −1. Answer: x−62x −1 Example 3: Rest: 2x+7(x+5)(x−3)−x+10(x+5)(x−3). Solution: We use parentheses to remind us to subtract the entire numerator of the second rational expression. Answer: 1x+5 Example 4: Simplify: 2x2+10x+3x2−36−x2+6x+5x2−36+x−4x2−36. Solution: Subtract and add the numerators. Make use of parentheses and write the result on the common denominator, x2−36. Answer: x −1x −6 Try this! Rest: x2+12x2−7x−4−x2−2x2x2−7x−4. Answer: 1x −4 To add rational expressions with denominators unlike denominators, you first find equivalent expressions with common denominators. Do it as you have with fractions. If fraction denominators are relatively first, then the least common denominator (LCD) is your product. For example, multiply each fraction by the appropriate shape of 1 to obtain equivalent fractions with a common denominator. The process of adding and other rational expressions is similar. In general, taking into account polynomials P, Q, R and S, where Q≠0 and S≠0, we have the following: In this suppose that all the variable factors in the denominator are not zero. Example 5: Add: 1x + 1y. Solution: a a for example, LCD=xy. For equivalent terms with this common denominator, multiply the first term by yy and the second quarter by xx. Answer: y+xxy Example 6: Subtract: 1y −1y−3. Solution: From LCD=y(y−3), multiply the first term by 1 in the form of (y−3)(y−3) and the second term by yy. Answer: −3y(y−3) It is not always the case that the LCD is the product of the given denominators. Denominators are usually not relatively first; therefore, determining the LCD requires some thought. Start by factoring in all denominators. The LCD is the product of all the factors with the most power. For example, since there are three base factors in the denominator: x , (x+2), and (x−3). The highest powers of these factors are x3, (x+2)2 and (x−3)1. Therefore, the general steps to add or subtract rational expressions are illustrated in the following example. Example 7: Rest: xx2+4x+3−3x2−4x−5. Solution: Step 1: Factor all denominators to determine the LCD. The LCD is (x+1)(x+3)(x−5). Step 2: Multiply by the right factors to get equivalent terms with a common denominator. To do this, multiply the first term by (x−5)(x−5) and the second term by (x+3)(x+3). Step 3: Add or subtract the numerators and place the result on the common denominator. Step 4: Simplify the resulting algebraic fraction. Answer: (x−9)(x+3)(x−5) Example 8: Rest: x2−9x+18x2−13x+36−xx−4. Solution: It is best not to take into account the numerator, x2−9x+18, since most likely they will have to simplify after subtracting. Answer: 18(x−4)(x−9) Example 9: Rest: 1x2 −4 −12−x. Solution: First, factor the denominators and determine the LCD. See how the opposite binomial property is applied to get a more feasible denominator. The LCD is (x+2)(x−2). Multiply the second term by 1 in the form of (x+2)(x+2). Now that we have equivalent terms with a common denominator, add the numerators and type the result on the common denominator. Answer: x+3(x+2)(x−2) Example 10: Simplify: y−1y+1−y+1y−1+y2−5y2−1. Solution: Start by lying to the denominator. We can see that the LCD is (y+1)(y−1). Search for equivalent fractions with this denominator. Then subtract and add the numerators and place the result on the common denominator. End up simplifying the resulting rational expression. Answer: y −5y −1 Try this! Simplify: −2x2−1+x1+x−51−x. Response: x+3x−1 Rational expressions are sometimes expressed using negative exponents. In this case, apply the rules for negative exponents before simplifying the expression. Example 11: Simplify: y −2+(y−1)−1. Solution: Remember that x−n=1xn. We begin by rewriting negative exponents as rational expressions. Answer: y2+y−1y2(y−1) We can simplify sums or differences in rational functions using the techniques learned in this section. The result restrictions consist of restrictions on the domains of each function. Example 12: calculate (f+g)(x), f(x)=1x+3 and g(x)=1x−2, and save the restrictions. Solution: Here the domain of f consists of all the except −3, and the g domain consists of all real numbers except 2. Therefore, the f+ g domain consists of all real numbers except −3 and 2. Answer: 2x+1(x+3)(x−2), where x≠−3, 2 Example 13: Calculate (f−g)(x), give f(x)=x(x−1)x2−25 and g(x)=x−3x−5, and indicate the restrictions on the domain. Solution: The f domain consists of all real numbers except 5 and −5, and the g domain consists of all real numbers except 5. Therefore, the domain of f − g consists of all real numbers except −5 and 5. Answer: −3x+5, on x≠±5 Key Takeaways When adding or subtracting rational expressions with a common denominator, add or subtract expressions in the numerator and write the result on the common denominator. To find equivalent rational expressions with a common denominator, first factor all denominators and determine the least common multiple. Then multiply the numerator and denominator of each term by the right factor to obtain a common denominator. Finally, add or subtract the expressions in the numerator and type the result on the common denominator. Restrictions on the domain of a sum or difference in rational functions consist of restrictions on the domains of each function. Part A: Add and subtract with common denominators Simplify. (Let's say all denominators are not zero.) 1. 3x+7x 2. 9x −10x 3. Xy−3y 4. 4x−3+6x−3 5. 72x −1 −x2x −1 6. 83x −8 −3x3x −8 7. 2x−9+x−11x−9 8. y+22y+3−y+32y+3 9. 2x −34x −1 −x−44x−1 10. 2xx−1−3x+4x−1+x−2x−1 11. 13y−2y−93y−13−5y3y 12. −3y+25y−10+y+75y−10−3y+45y−10 13. x(x+1)(x−3)−3(x+1)(x−3) 14. 3x+5(2x−1)(x−6)−x+6(2x−1)(x−6) 15. Xx2−36+6x2−36 16. Xx2−81−9x2−81 17. x2+2x2+3x−28+x−22x2+3x−28 18. x2x2−x−3−3−x2x2−x−3 Part B: Adding and remaining with Unlike simplify denominators. (Let's say all denominators are not zero.) 19. 12+13x 20. 15x2−1x 21. 112y2+310y3 22. 1x −12y 23. 1y−2 24. 3y+2−4 25. 2x+4+2 26. 2y−1y2 27. 3x+1+1x 28. 1x −1 −2x 29. 1x−3+1x+5 30. 1x+2 −1x−3 31. Xx+1 −2x −2 32. 2x −3x+5−xx−3 33. y+1y−1+y−1y+1 34. 3y−13y −y+4y−2 35. 2x −52x+5−2x+52x−5 36. 22x −1 −2x+11−2x 37. 3x+4x−8−28−x 38. 1y−1+11−y 39. 2x2x2−9+x+159−x2 40. Xx+3+1x−3−15−x(x+3)(x−3) 41. 2x3x −1 −13x+1+2(x−1)(3x−1)(3x+1) 42. 4x2x+1−xx−5+16x−3(2x+1)(x−5) 43. X3x+2x−2+43x(x−2) 44. −2xx+6−3x6−x−18(x−2)(x+6)(x−6) 45. Xx+5−1x −7 −25 −7x(x+5)(x−7) 46. Xx2−2x−3+2x−3 47. 1x+5−x2x2−25 48. 5x −2x2 −4 −2x −2 49. 1x+1 −6x −3x2 −7x −8 50. 3x9x2 −16−13x+4 51. 2xx2−1+1x2+x 52. x(4x−1)2x2+7x−4−x4+x 53. 3x23x2+5x−2−2x3x −1 54. 2xx−4−11x+4x2−2x−8 55. X2x+1+6x−242x2−7x−4 56. 1x2 −x−6+1x2−3x−10 57. Xx2+4x+3−3x2−4x−5 58. y+12y2+5y−3−y4y2−1 59. and −1y2 −25−2y2−10y+25 60. 3x2+24x2−2x−8−12x−4 61. 4x2+28x2−6x−7−28x−7 62. a4−a+a2−9a+18a2−13a+36 63. 3rd −12a2 −8a+16−a+24−64. At −142a2 −7a−4−51+2a 65. 1x+3−xx2−6x+9+3x2−9 66. 3xx+7 −2xx−2+23x−10x2+5x−14 67. x+3x−1+x−1x+2−x(x+11)x2+x−2 68. −2x3x+1−4x−2+4(x+5)3x2−5x−2 69. x−14x −1 −x+32x+3−3(x+5)8x2+10x−3 70. 3x2x −3−22x+3−6x2 −5x −94x2−9 71. 1y+1+1y+2y2−1 72. 1y−1y+1+1y−1 73. 74. 6 x 1+4-2 75. X-1+y-1 76. X-2-1-77. (2x x 1)-1 x-2 78. 78. 79. 3x2(x−1)−1−2x 80. 2(y−1)−2−(y−1)−1 Part C: Add and subtract rational functions Calculate (f+g)(x) and (f−g)(x) and indicate restrictions on the domain. 81. f(x)=13x and g(x)=1x−2 82. f(x)=1x−1 and g(x)=1x+5 83. f(x)=xx−4 and g(x)=14−x 84. f(x)=xx−5 and g(x)=12x−3 85. f(x)=x−1x2−4 and g(x)=4x2−6x−16 86. f(x)=5x+2 and g(x)=3x+4 Calculate (f+f)(x) and place the restrictions on the domain. 87. f(x)=1x 88. f(x)=12x 89. f(x)=x2x−1 90. f(x)=1x+2 Part D: Discussion panel 91. Explain to a classmate why this is incorrect: 1x2+2x2=32x2. 92. Explain to a classmate how to find the common denominator when adding algebraic expressions. Give an example. 1: 10x 3: x−3y 5: 7−x2x−1 7: 1 9: x+14x−1 11: y−1y 13: 1x+1 15: 1x−6 17: x+5x+7 19: 3x+26x 21: 5y+1860y3 23: 1 −2yy 25: 2(x+5)x+4 27: 4x+1x(x+1) 29: 2(x+1)(x−3)(x++ 2 31: x2 −4x −2 (x−2)(x+1) 33: 2(y2+1)(y+1)(y−1) 35 : −40x(2x+5)(2x−5) 37: 3(x+2)x−8 39: 2x+5x+3 41: 2x+13x+1 43: x2+4x+43x(x−2) 45: x−6x−7 47: −x2+x−5(x+5)(x−5) 49: −x2+x−5 5x−5x−8 51: 2x −1x(x−1) 53: x(x−4)(x+2)(3x−1) 55: x+62x+1 57: x−9(x −5)(x+3) 59: y2−8y−5(y+5)(y−5)2 61: 4xx+1 63 : a+5a−4 65 : −6x(x+3)(x−3)2 67: x−7x+2 69: −x−54x−1 71: 2y−1y(y−1) 73: 27 50 75: x+yxy 77: (x−1)2x2(2x−1) 79: x(x+2)x−1 81: (f+g)(x)=2(2x−1)3x(x−2); No, no, no, no. (x)=−2(x+1)3x(x−2); x≠0, 2 83: (f+g)(x)=x−1x−4; No, no, no, no. (x)=x+1x−4; x≠4 85: (f+g)(x)=x(x−5)(x+2)(x−2)(x−8); No, no, no, no. (x)=x2−13x+16(x+2)(x−2)(x−8); x≠−2, 2, 8 87: (f+f)(x)=2x; x≠0 89: (f+f)(x)=2x2x−1; x≠12 x≠12