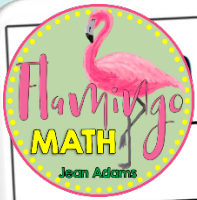


Algebra 2 Honors

Add & Subtract Rational Expressions



5: Add & Subtract Rational Expressions

Vocabulary

Complex fraction

a rational expression that has a fraction in its numerator or denominator, or in both its numerator and denominator.

Least Common Multiple

the product of the prime factors, each raised to the greatest power that occurs in any of the expressions.

EXAMPLES:

$$\frac{\frac{3}{2}}{\frac{5}{5}}$$

$$\frac{\frac{x-4}{2}}{5x}$$

EX:

$12xy^2$ and $15x^3y$

$$\begin{array}{l} \textcircled{2} \textcircled{2} \textcircled{3} \textcircled{x} \textcircled{y} \textcircled{y} \\ \textcircled{3} \textcircled{5} \textcircled{x} \textcircled{x} \textcircled{x} \textcircled{y} \end{array} \} 60x^3y^2$$

Completely Editable

8.5

Lesson 8.5: Add & Subtract Rational Expressions

Vocabulary	EXAMPLES:
Complex fraction a rational expression that has a fraction in its numerator or denominator, or in both its numerator and denominator.	
Least Common Multiple the product of the prime factors, each raised to the greatest power that occurs in any of the expressions.	EX: $12x^2y$ and $15x^3y$
Adding and Subtracting Fractions	
Same Denominators:	
Different Denominators:	
Finding the Least Common Multiple	
To find the LCM of two expressions, factor them. Then, use each factor the greatest number of times it occurs in any one expression.	
EX #1: Find the LCM of each expression.	
A. $2x + 4$ and $x^2 - x - 6$	B. $x^2 + 3x - 4$, $x^2 + 2x - 8$, and $x^2 - 4x + 4$

Adding Rational Expressions

EX #2: What is the sum in simplest form? State any restrictions on the variables.

A. $\frac{x+1}{x-1} + \frac{2}{x^2-x}$

B. $\frac{y-9}{y^2-16} + \frac{y-7}{16-y^2}$

Subtracting Rational Expressions

EX #3: Find the difference in simplest form. State any restrictions on the variables.

A. $\frac{x+3}{x-2} - \frac{6x-7}{x^2-3x+2}$

B. $\frac{x-1}{x+5} - \frac{x+3}{x^2+6x+5}$

Simplifying a Complex Fraction

METHOD 1:	1. Simplify numerator and denominator separately to obtain a single fractional expression in each. 2. Treat the result as a division. 3. Factor and simplify as usual.
METHOD 2:	1. Find the LCM of all denominators appearing in the complex fractional expression. 2. Multiply the complex fractional expression by choosing a "well-chosen 1" in the form n/n , where n is the LCM found in step 1. The distributive property is important here. 3. Factor and simplify as usual.
EX #4: Find the simplest form of the complex fraction using either method.	
A. $\frac{x + \frac{1}{2}}{x - \frac{1}{7}}$	B. $\frac{\frac{3}{x} + \frac{4}{y}}{\frac{4}{x} - \frac{3}{y}}$

Complex Fractions - Another Challenge

EX #5: Simplify.

A. $\frac{\frac{x-2}{x} + \frac{2}{x+1}}{\frac{3}{x-1} - \frac{1}{x+1}}$

B. $\frac{\frac{x^2-x-6}{x^2-5x-14}}{\frac{x^2+6x+5}{x^2-6x-7}}$

NOTES

Add and Subtract Rational Expressions Practice**Problems 1–4**, find the least common multiple of each pair of polynomials.

1. $3x^2 - 27$ and $x + 3$

2. $x^2 - 1$ and $x^2 + 2x + 1$

3. $x + 2$ and $x^2 + 6x + 8$

4. $2x + 10$ and $x^2 + 12x + 35$

Problems 5–16, simplify.

5. $\frac{x^2}{x+2} + \frac{3x^2+8}{x+2}$

6. $\frac{x^2-10}{12} + \frac{x}{4}$

7. $\frac{m^2}{m^2-16} - \frac{2}{m+4}$

8. $\frac{4}{x^2-9} + \frac{2}{x^2+4x+3}$

9. $\frac{3x}{7y^2} - \frac{4}{21x^2y}$

10. $5 - \frac{1}{x^2+2}$

11. $\frac{4x}{x+3} + \frac{4x}{x-3}$

12. $\frac{x}{4x+8} - \frac{1}{x^2+2x}$

13. $\frac{2m}{m^2-25} - \frac{9}{m-5}$

14. $\frac{y+3}{y^2+y-6} - \frac{y}{y^2-5y+6}$

15. $\frac{3}{x^2+x-2} + \frac{2x}{x^2-4} - \frac{5}{x^2-3x+2}$

16. $\frac{m}{m^2-1} + \frac{m-1}{2m+3} - \frac{3}{2m-2}$

Problems 17–20, simplify each complex fraction.

17. $\frac{\frac{2}{x+y}}{\frac{y}{x-y}}$

18. $\frac{\frac{4}{x-3}}{1 - \frac{3}{x-1}}$

19. $\frac{\frac{1}{\frac{3+y}{3+x}}}{\frac{3+x}{4}}$

20. $\frac{\frac{4}{x}}{\frac{x}{x+y}}$

Problems 21–24, write a function that models each situation. Then use it to solve the question.

21. The distance a force can move an object is $\frac{8}{x^2-3x}$ ft. The distance a second force can move an object is $\frac{2x}{x^2-6x+9}$ feet. Find the difference of the first distance from the second distance.

22. The focal length f of a camera lens is 2 in. The lens equation is $\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$, where d_i is the distance between the lens and the film and d_o is the distance between the lens and the object. If you are taking a photograph of your best friend who is 8 feet away, how far should the lens be from the film.

23. The time it takes a canoe to row upstream is $\frac{5}{x-2}$ hours. The time to row downstream is $\frac{2}{x+2}$ hours. Find the total time for the round trip.

24. The total resistance for a parallel circuit is given by the formula below.

Practice Sets

Lesson Warm-Ups

$6xy$, $9x^2$, and $15xy^3$	$x^2 - x - 12$ and $x^2 + 5x + 6$
3. Simplify the sum. $\frac{3x+5}{2x} + \frac{5x+7}{2x}$	3. Simplify the difference. $\frac{x}{4x+8} - \frac{1}{x^2+2x}$

Name _____ Date _____ Period _____	
Lesson 8.5: Adding & Subtracting Rational Expressions Warm-Up #2	
1. Find the least common multiple of the polynomials. $10x$, $6xy^2$, and $25x^2y$	2. Find the least common multiple for the pair of polynomials. $x^2 + 6x + 8$ and $x^2 - 3x - 10$
3. Simplify the sum. $\frac{5x+7}{3x} + \frac{4x+5}{3x}$	3. Simplify the difference. $\frac{x}{3x+9} - \frac{3}{x^2+3x}$

Form A	8.5 Add and Subtract Rational Expressions	Form B
_____	Name _____	_____
_____	Date _____	Period _____
_____	Questions 1-3: Add or subtract. State any restrictions on the variables.	
_____	1. $\frac{3x+4}{x-3} - \frac{x-4}{x-3}$	
_____	2. $\frac{5x}{x^2-1} - \frac{2}{x-1}$	
_____	3. $\frac{x-2}{x+3} + \frac{x-3}{x+4}$	

2. $\frac{3x}{x^2-4} - \frac{4}{x+2}$

3. $\frac{x-1}{x+2} + \frac{x-2}{x+3}$

Daily Lesson Quiz