ALGEBRA 2B **Name:** ______________________________________

Date: __________

Learning Targets:

Unit 11: Rationals (Algebraic)

Lesson	Assignment	
11.1 Multiplying and Dividing Rational Expressions		
Learning Targets:	Worksheet 11.1	
▪ I can simplify rational expressions.		
▪ I can simplify complex fractions.		
11.2 Adding and Subtracting Rational Expressions		
Learning Targets:	Worksheet 11.2	
▪ I can add and subtract rational expressions.		
Practice Quiz 11.1-11.2		
▪ I can simplify rational expressions.	Practice Quiz 11.1-11.2	
▪ I can simplify complex fractions.		
▪ I can add and subtract rational expressions.		
11.3 Solving Rational Equations		
Learning Targets:	Worksheet 11.3	
▪ I can solve rational equations.		
Unit 11 Review	**Review Worksheet**	
Study for the test!	**Practice Test**	

Seminar:

Tuesday and Thursday

Lesson: 12.1

Multiplying and Dividing Rational Expressions

<table>
<tr><td>Objective</td><td>

- ❑ **I can simplify rational expressions.**
- ❑ **I can simplify complex fractions .**

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<tr><td>Vocabulary</td><td>

- **Rational Expression**: It's the ratio of two polynomial expressions

  Examples:

- **Complex Fraction**: It's a rational expression whose numerator and/or denominator contains a rational expression.

  Examples:

Multiplying Rational Expressions:

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}, \text{ if } b \neq 0 \text{ and } d \neq 0$$

Dividing Rational Expressions:

$$\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}, \text{ if } b \neq 0,\ c \neq 0, \text{ and } d \neq 0$$

Review:

How to multiply and divide monomials:

How to multiply, divide and find the power of a power:

How to factor polynomials:

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Summary of Factoring Techniques

- For **all** polynomials, first factor out the **g**reatest **c**ommon **f**actor (**GCF**).
- For a **binomial**, check to see if it is any of the following:
  a. difference of squares: $x^2 - y^2 = (x + y)(x - y)$
  b. difference of cubes: $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$
  c. sum of cubes: $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$
- For a **trinomial**, use the X
  $ax^2 + bx + c$:

(c) $x^2 + 2xy + y^2 = (x + y)^2$
$x^2 - 2xy + y^2 = (x - y)^2$ square trinomials

Instruction

Example 1: *Simplify.*

a. $$\frac{24a^5b^2}{(2ab)^4}$$

b. $$\frac{3r^2s^3}{5t^4} \cdot \frac{20t^2}{9r^3s}$$

c. $$\frac{x^2+8x+16}{2x-2} \div \frac{x^2+2x-8}{x-1}$$

d. $$\frac{\dfrac{3x-1}{x}}{\dfrac{3x^2+8x-3}{x^4}}$$

Y
o
u
r

T
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n

Simplify each expression:

1. $\dfrac{(-2ab^2)^3}{20ab^4}$

2. $\dfrac{\dfrac{a^2bc^3}{x^2y^2}}{\dfrac{ab^2}{c^4x^2y}}$

4. $\dfrac{3m^3 - 3m}{6m^4} \cdot \dfrac{4m^5}{m + 1}$

6. $\dfrac{\dfrac{a^2 - 16}{a + 2}}{\dfrac{a^2 + 3a - 4}{a^2 + a - 2}}$

7. $\frac{x-3}{a+b} \cdot \frac{a^2-b^2}{3-x}$

8. $\frac{16p^2 - 8p + 1}{14p^4} \div \frac{4p^2 + 7p - 2}{7p^5}$

Closure: lesson 12.1

1. a. In order to simplify a rational number or rational expression, ________________ the numerator and ________________ and divide both of them by their ________________________________.

b. A rational expression is undefined when its ________________ is equal to __________. To find the values that make the expression undefined, completely ________________ the original ________________ and set each factor equal to __________.

2. a. To multiply two rational expressions, ________________ the ________________ and multiply the denominators.

b. To divide two rational expressions, ________________ by the ________________ of the ________________.

3. a. Which of the following expressions are complex fractions?

i. $\frac{7}{12}$ **ii.** $\frac{\frac{3}{8}}{\frac{5}{16}}$ **iii.** $\frac{r+5}{r-5}$ **iv.** $\frac{\frac{z+1}{z}}{z}$ **v.** $\frac{\frac{r^2-25}{9}}{\frac{r+5}{3}}$

b. Does a complex fraction express a multiplication or division problem? How is multiplication used in simplifying a complex fraction?

Warm Up (lesson 12.1) *Simplify each expression.*

1. $\dfrac{24rs^2}{-8s}$

3. $\dfrac{3b^2-7b+2}{b^2+3b-10}$

6. *For what value(s) of x is the expression undefined?*

$$\frac{8x}{(4-x)(x^2-1)}$$

ALGEBRA 2B
Lesson: 12.2

Name: ____

Date: __________

Adding and Subtracting Rational Expressions

Objective

- ❑ **I can determine the LCM of polynomials**
- ❑ **I can add and subtract rational expressions**

Vocabulary

To add and subtract Rational Expressions:

Step 1 If necessary, find equivalent fractions that have the same denominator.
Step 2 Add or subtract the numerators.
Step 3 Combine any like terms in the numerator.
Step 4 Factor if possible.
Step 5 Simplify if possible.

To find equivalent fractions with the ***same*** *denominator, we need the LCM.*

LCM of Polynomials To find the least common multiple of two or more polynomials, factor each expression. The LCM contains each factor the greatest number of times it appears as a factor.

Example 1 **Find the LCM of $16p^2q^3r$, $40pq^4r^2$, and $15p^3r^4$.**

Example 2 **Find the LCM of $3m^2 - 3m - 6$ and $4m^2 + 12m - 40$.**

Instruction	**Example** Simplify $\frac{6}{2x^2 + 2x - 12} - \frac{2}{x^2 - 4}$.
Your Turn	**Your Turn:** **1.** $\frac{-7xy}{3x} + \frac{4y^2}{2y}$ **2.** $\frac{2}{x-3} - \frac{1}{x-1}$

Your Turn	3. $\frac{4a}{3bc} - \frac{15b}{5ac}$ 4. $\frac{3}{x+2} + \frac{4x+5}{3x+6}$ 5. $\frac{3x+3}{x^2+2x+1} + \frac{x-1}{x^2-1}$ 6. $\frac{4}{4x^2-4x+1} - \frac{5x}{20x^2-5}$
	Closure: Lesson 12.2

1. a. In work with rational expressions, LCD stands for ______________________________
and LCM stands for ______________________________. The LCD is the __________ of the denominators.

b. To find the LCM of two or more numbers or polynomials, ________________ each number or ________________. The LCM contains each ________________ the ________________ number of times it appears as a ________________.

2. To add $\frac{x^2-3}{x^2-5x+6}$ and $\frac{x-4}{x^3-4x^2+4x}$, you should first factor the ________________ of each fraction. Then use the factorizations to find the __________ of x^2-5x+6 and x^3-4x^2+4x. This is the __________ for the two fractions.

3. When you add or subtract fractions, you often need to rewrite the fractions as equivalent fractions. You do this so that the resulting equivalent fractions will each have a denominator equal to the __________ of the original fractions.

4. To add or subtract two fractions that have the same denominator, you add or subtract their ________________ and keep the same ________________.

5. The sum or difference of two rational expressions should be written as a polynomial or as a fraction in ________________.

Warm-up (lesson 12.2)

1. Find the LCM of $13xy^3$ and $20x^2y^2z$.

2. Simplify: $\frac{3}{mn}+\frac{4}{5m}=$

3. Simplify: $\frac{x+5}{2x-12}-\frac{x+2}{3x-18}=$

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Lesson: 12.3 **Date: __________**

Solving Rational Equations

Objective	❑ **I can solve Rational Equations**
Vocabulary	*A rational equation is* ____ ____ *Hint: When solving a rational equation,* ***eliminate the fractions first!*** ***Check the solutions in the original equation***
Instruction	**Example** **Solve** $\frac{9}{10} + \frac{2}{x+1} = \frac{2}{5}$. Restriction: _________________

Your Turn

1. $\frac{2y}{3} - \frac{y+3}{6} = 2$

4. $\frac{3m+2}{5m} + \frac{2m-1}{2m} = 4$

#4 Restriction: ________________

5. $\frac{4}{x-1} = \frac{x+1}{12}$

9. $\frac{x-2}{x+4} = \frac{x+1}{x+10}$

#5 Restriction: ________________

#9 Restriction: ________________

19. $\frac{1}{n+3} + \frac{5}{n^2-9} = \frac{2}{n-3}$

#19 Restriction: _______________

21. $\frac{x-8}{2x+2} + \frac{x}{2x+2} = \frac{2x-3}{x+1}$

#21 Restriction: _________________

22. $\frac{12s+19}{s^2+7s+12} - \frac{3}{s+3} = \frac{5}{s+4}$

#22 Restriction: ________________