Chapter 6 section 2

- Adding and Subtracting Rational Expressions
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Denominators the same

- $\frac{x}{x+5}+\frac{9x+3}{x+5}$
- $\frac{3x}{7x-4}-\frac{2x-1}{7x-4}$

- Add or subtract the numerators and leave the denominator alone.
- Reduce

Try These

a) $\frac{y^2}{y^2-25}+\frac{25-10y}{y^2-25}$

b) $\frac{y^2+3y-6}{y^2-5y+4}-\frac{4y-4-2y^2}{y^2-5y+4}$

When subtracting, be sure to take the opposite of the second term

Fraction with unlike denominators

- To add or subtract these fractions the **denominators need to be the same**.
- Can not add or subtract fractions that have different denominators.
- Need to find the least common denominator.

Least Common Denominator

Finding the Least Common Denominator

1. Factor each denominator completely.
2. List the factors of the first denominator.
3. Add to the list in step 2 any factors of the second denominator that do not appear in the list.
4. Form the product of each different factor from the list in step 3. This product is the least common denominator.

$$\frac{3}{10x^2} \text{ and } \frac{7}{15x}$$

1) $10x^2 = 2 \cdot 5 \cdot x \cdot x, \quad 15x = 3 \cdot 5 \cdot x$

2) $2 \cdot 5 \cdot x \cdot x$

3) 3 need to be added

4) $3 \cdot 2 \cdot 5 \cdot x \cdot x$ LCD

Find the least common denominator

a) $\frac{11}{25x^2}$ *and* $\frac{14}{35x}$

b) $\frac{8}{x^2-16}$ *and* $\frac{x}{x^2-10x+25}$

c) Write each fraction with the LCD

Add, Sub, different denominators.

Adding and Subtracting Rational Expressions That Have Different Denominators

1. Find the LCD of the rational expressions.
2. Rewrite each rational expression as an equivalent expression whose denominator is the LCD. To do so, multiply the numerator and the denominator of each rational expression by any factor(s) needed to convert the denominator into the LCD.
3. Add or subtract numerators, placing the resulting expression over the LCD.
4. If possible, simplify the resulting rational expression.

Simplify

d) $\frac{3}{5x^2}+\frac{10}{x}$

e) $\frac{3x}{x^2-25}-\frac{4}{x+5}$

f) $\frac{x+4}{x^2-x-2}-\frac{2x+3}{x^2+2x-8}$

Summary

- Fractions with same denominator
  - Add or subtract the numerator
  - Reduce
- Fractions with different denominator
  - Find the LCD of the denominators
  - Rewrite each fraction with the LCD
  - Add or subtract the numerators
  - Reduce