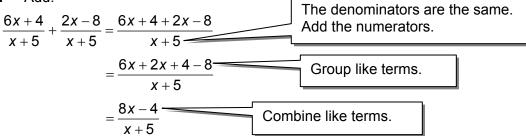Name _____ Date _____ Class_____

Reteach
Adding and Subtracting Rational Expressions

Use a common denominator to add or subtract rational expressions.

Add: $\dfrac{6x+4}{x+5} + \dfrac{2x-8}{x+5}$.

Step 1 Add.

$\dfrac{6x+4}{x+5} + \dfrac{2x-8}{x+5} = \dfrac{6x+4+2x-8}{x+5}$ ⟶ The denominators are the same. Add the numerators.

$= \dfrac{6x+2x+4-8}{x+5}$ ⟶ Group like terms.
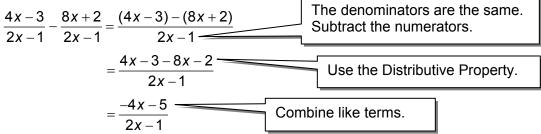
$= \dfrac{8x-4}{x+5}$ ⟶ Combine like terms.

Step 2 Identify *x*-values for which the expression is undefined.

$x \neq -5$ because -5 makes the denominator equal 0.

Subtract: $\dfrac{4x-3}{2x-1} - \dfrac{8x+2}{2x-1}$.

Step 1 Subtract.

$\dfrac{4x-3}{2x-1} - \dfrac{8x+2}{2x-1} = \dfrac{(4x-3)-(8x+2)}{2x-1}$ ⟶ The denominators are the same. Subtract the numerators.

$= \dfrac{4x-3-8x-2}{2x-1}$ ⟶ Use the Distributive Property.

$= \dfrac{-4x-5}{2x-1}$ ⟶ Combine like terms.

Step 2 Identify *x*-values for which the expression is undefined.

$x \neq \dfrac{1}{2}$ because $\dfrac{1}{2}$ makes the denominator equal 0.

Add or subtract.

1. $\dfrac{x-5}{x^2-4} + \dfrac{3x+2}{x^2-4}$

   $\dfrac{(x-5)+(3x+2)}{x^2-4}$

   _____

   $x \neq$ _____

2. $\dfrac{7x-5}{x+3} - \dfrac{4x-1}{x+3}$

   $\dfrac{(7x-5)-(4x-1)}{x+3}$

   _____

   $x \neq$ _____

3. $\dfrac{2x-1}{x-1} - \dfrac{5x+4}{x-1}$

   _____

   _____

   $x \neq$ _____

4. $\dfrac{4x+1}{3x+7} + \dfrac{9-x}{3x+7}$

   _____

   $x \neq$ _____

5. $\dfrac{8-x}{x-3} - \dfrac{5-x}{x-3}$

   _____

   $x \neq$ _____

6. $\dfrac{5x+2}{x^2-1} - \dfrac{3x-7}{x^2-1}$

   _____

   $x \neq$ _____

Holt McDougal Algebra 2

LESSON
5-3

Reteach

Adding and Subtracting Rational Expressions (continued)

Use the least common denominator (LCD) to add rational expressions with different denominators. The process is the same as adding fractions with different denominators.

Add: $\dfrac{x-4}{x^2+2x-3}+\dfrac{2x}{x-1}$.

Step 1 Factor denominators completely.

$$\dfrac{x-4}{x^2+2x-3}+\dfrac{2x}{x-1}=\dfrac{x-4}{(x+3)(x-1)}+\dfrac{2x}{x-1}$$

Step 2 Find the LCD.
The LCD is the least common multiple of the denominators:
$(x+3)(x-1)$.

Step 3 Write each term of the expression using the LCD.

$$\dfrac{2x}{x-1}=\dfrac{2x}{x-1}\left(\dfrac{x+3}{x+3}\right)=\dfrac{2x^2+6x}{(x-1)(x+3)}$$

So, $\dfrac{x-4}{(x+3)(x-1)}+\dfrac{2x}{x-1}=\dfrac{x-4}{(x+3)(x-1)}+\dfrac{2x^2+6x}{(x-1)(x+3)}$

Step 4 Add the numerators and simplify.

$$\dfrac{x-4+2x^2+6x}{(x+3)(x-1)}=\dfrac{2x^2+7x-4}{(x+3)(x-1)}$$

Step 5 Identify *x*-values for which the expression is undefined.

$x\neq-3$ or 1 because both values make the denominator equal 0.

Add.

7. $\dfrac{x-1}{x^2-4}+\dfrac{3x}{x+2}$

$\dfrac{x-1}{(x+2)(x-2)}+\dfrac{3x}{x+2}$

$\dfrac{x-1}{(x+2)(x-2)}+\dfrac{3x}{x+2}\left(\dfrac{x-2}{x-2}\right)$

_____

$x\neq$ _____

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

_____

_____

_____

$x\neq$ _____

9. What is the LCD of $\dfrac{2x+1}{x^2-9}$ and $\dfrac{7}{x^2-x-6}$?

_____

3. $\dfrac{4x^2 - 2x - 4}{3x^2 - 11x - 4}$; $x \neq -\dfrac{1}{3}$ and $x \neq 4$

4. $\dfrac{3x - 7}{x^2 - 7x + 10}$; $x \neq 5$, $x \neq 2$

5. $\dfrac{8x^2 + 4x - 3}{8x^2 - 2}$; $x \neq \pm\dfrac{1}{2}$

6. $\dfrac{3x^2 - 20x - 10}{x^3 - 6x^2 - x + 30}$; $x \neq -2$, $x \neq 3$, $x \neq 5$

7. $\dfrac{x - 2}{x^2 - 8}$

8. $\dfrac{5}{11x + 22}$

9. $\dfrac{x^2 - x - 42}{x^2 - 3x - 10}$

10. $\dfrac{x^3 - 4x^2 - 11x - 6}{x^3 + 3x}$

11. $\dfrac{e(2x - 3)}{x^2 - 3x - 4}$

Reteach

1. $\dfrac{4x - 3}{x^2 - 4}$; $-2, 2$

2. $\dfrac{3x - 4}{x + 3}$; -3

3. $\dfrac{-3x - 5}{x - 1}$; 1

4. $\dfrac{3x + 10}{3x + 7}$; $-\dfrac{7}{3}$

5. $\dfrac{3}{x - 3}$; 3

6. $\dfrac{2x + 9}{x^2 - 1}$; ± 1

7. $\dfrac{x - 1 + (3x^2 - 6x)}{(x + 2)(x - 2)} = \dfrac{3x^2 - 5x - 1}{(x + 2)(x - 2)}$

$x \neq -2, 2$

8. $\dfrac{4x - 1}{(x + 2)(x + 1)} + \dfrac{3}{x + 1}\left(\dfrac{x + 2}{x + 2}\right)$

$\dfrac{4x - 1 + 3x + 6}{(x + 2)(x + 1)}$

$\dfrac{7x + 5}{(x + 2)(x + 1)}$

$x \neq -2, -1$

9. $(x - 3)(x + 3)(x + 2)$

Challenge

1. $\dfrac{5}{x + 1} - \dfrac{2}{x + 4}$

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

3. $\dfrac{5}{x + 1} + \dfrac{3}{x - 2} - \dfrac{1}{x + 3}$

4. $\dfrac{-1}{x - 1} - \dfrac{3}{(x - 1)^2} + \dfrac{2}{x - 2}$

Problem Solving

1. a. $\dfrac{d}{6} + \dfrac{d}{3}$

   b. $2d$

   c. $\dfrac{2d}{\dfrac{d}{6} + \dfrac{d}{3}}$

   d. Vicki is correct. Possible answer:
   Lorena calculated the average speed
   as if it took the same amount of time
   for each leg of the trip. Vicki took into
   consideration the time for each leg.

2. 4.8 knots

3. D

4. C

5. B

6. D

Reading Strategies

1. $6x^6$

2. $10x^4y^3$

3. $(x - 8)(x + 1)$

4. $(x - 3)(x - 2)$

5. $\dfrac{8x}{x - 3} \div \dfrac{x^2}{2}$; $\dfrac{8x}{x - 3} \cdot \dfrac{2}{x^2}$

6. $\dfrac{2}{x - 1} \div \dfrac{x + 1}{x^3}$; $\dfrac{2}{x - 1} \cdot \dfrac{x^3}{x + 1}$

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