

Lesson Title 7.3 Adding & Subtracting Rational Expressions with Common Denominators DAY ONE NOTES

**OBJECTIVE 1: Adding & Subtracting Rational Expressions with Common Denominators**

$$\text{Add: } \frac{6}{5} + \frac{2}{5} = \frac{8}{5}$$

$$\text{Add: } \frac{9}{x+2} + \frac{3}{x+2} = \frac{12}{x+2}$$

Add the numerators and place the sum over the common denominator.

$$\frac{6}{5} + \frac{2}{5} = \frac{6+2}{5} = \frac{8}{5}$$

$$\frac{9}{x+2} + \frac{3}{x+2} = \frac{9+3}{x+2} = \frac{12}{x+2}$$

**Adding and Subtracting Rational Expressions with Common Denominators**  
 If  $\frac{P}{R}$  and  $\frac{Q}{R}$  are rational expressions, then

$$\frac{P}{R} + \frac{Q}{R} = \frac{P+Q}{R} \quad \text{and} \quad \frac{P}{R} - \frac{Q}{R} = \frac{P-Q}{R}$$

To add or subtract rational expressions, add or subtract the numerators and place the sum or difference over the common denominator.

STEPS:

1. Check for common denominators. If yes, move on.
2. Check is adding or subtracting. If adding move on, but if subtracting, change to addition and distribute the negative to the following numerator.
3. Keep common denominator and add like terms of the numerator.
4. Simplify if possible.

TASK 1: Add the fractions.

a)  $\frac{5m}{2n} + \frac{m}{2n}$

$$\frac{3m}{2n} = \frac{3m}{n}$$

$2n \neq 0$   
 $n \neq 0$

D:  $(-\infty, 0) \cup (0, \infty)$

b)  $\frac{7a}{4b} + \frac{a}{4b}$

$$\frac{2a}{4b} = \frac{2a}{b}$$

$4b \neq 0$   
 $b \neq 0$

D:  $(-\infty, 0) \cup (0, \infty)$

TASK 2: Subtract the fractions.

a)  $\frac{2y}{2y-7} + \frac{7}{2y-7}$

$\frac{\cancel{2y-7}}{\cancel{2y-7}} = \boxed{1}$

D:  $(-\infty, \frac{7}{2}) \cup (\frac{7}{2}, \infty)$

$2y-7 \neq 0$   
 $2y \neq 7$   
 $y \neq \frac{7}{2}$

b)  $\frac{3x}{3x-2} + \frac{7}{3x-2}$

$\frac{\cancel{3x-2}}{\cancel{3x-2}} = \boxed{1}$

D:  $(-\infty, \frac{2}{3}) \cup (\frac{2}{3}, \infty)$

$3x-2 \neq 0$   
 $3x \neq 2$   
 $x \neq \frac{2}{3}$

TASK 3: Subtract the fractions again.

a)  $\frac{3x^2+2x}{x-1} + \frac{10x-5}{x-1}$

$\frac{3x^2+2x-10x+5}{x-1}$

$\frac{x-1}{x-1}$

$\frac{3x^2-8x+5}{x-1}$

$\frac{\cancel{(3x-5)(x-1)}}{\cancel{(x-1)}} = \boxed{3x-5}$

D:  $(-\infty, 1) \cup (1, \infty)$

$x-1 \neq 0$   
 $x \neq 1$

b)  $\frac{4x^2+15x}{x+3} + \frac{8x+15}{x+3}$

$\frac{4x^2+15x+8x+15}{x+3}$

$\frac{4x^2+23x+15}{x+3}$

$\frac{(4x-5)(x+3)}{\cancel{(x+3)}} = \boxed{4x-5}$

D:  $(-\infty, -3) \cup (-3, \infty)$

$x+3 \neq 0$   
 $x \neq -3$

~~$\frac{4x-15}{-60} = \frac{12}{7}$~~

~~$\frac{35}{-3} = \frac{15}{-5} = \frac{28}{7}$~~

Common Mistakes:

Still need help with: