## Addition and Subtraction Properties

Remember how one adds or subtracts two fractions with the same denominator:

 $\frac{2}{7} + \frac{3}{7} = \frac{2+3}{7} = \frac{5}{7} \qquad \frac{6}{7} - \frac{2}{7} = \frac{6-2}{7} = \frac{4}{7}$  The same process works with rational expressions.

## **Property of Adding or Subtracting Rational Expressions**

If  $b \neq 0$ , then  $\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b}$  and  $\frac{a}{b} - \frac{c}{b} = \frac{a-c}{b}$ 

To add or subtract two rational expressions having the same denominators, add or subtract the numerators and place this sum or difference over the common denominator.

$$\frac{9-4y}{3y} + \frac{6-y}{3y} = \frac{9-4y+6-y}{3y} = \frac{15-5y}{3y}$$
$$\frac{9-4y}{3y} - \frac{6-y}{3y} = \frac{9-4y-(6-y)}{3y} = \frac{9-4y-6+y}{3y} = \frac{-3y+3}{3y} = \frac{-3(y-1)}{3y} = -\frac{y-1}{y}$$

TRY:

$$\frac{8x-5}{7x+3} + \frac{x-1}{7x+3} \qquad \qquad \frac{3z-7}{z(z-2)} - \frac{-2z+3}{z(z-2)}$$

Remember how one adds or subtracts two fractions with different denominators? Both fractions must be first changed to equivalent fractions with the same denominator.

Add  $\frac{1}{6} + \frac{3}{10}$ . First, one needs to find the LCM of 6 and 10. 2.3=6 2.5=10 The factors of the LCM are: 2.3.5 which equals 30. Change each fraction into an equivalent fraction:  $\frac{1}{6} \cdot \frac{5}{5} + \frac{3}{10} \cdot \frac{3}{3}$ Add the equivalent fractions:  $\frac{5}{30} + \frac{9}{30} = \frac{14}{30} = \frac{7}{15}$ A similar process works for rational expressions.