

**Rationals:**

**Add and Subtract Rational Expressions**

Objective:

Given a rational expression, students will be able to add ~~or~~ subtract by finding a common denominator.

Goal:

$$\frac{1}{x+2} - \frac{4}{x-3} \quad ?$$

Quiz tomorrow

Friday; need charged Chromebook to class

## Example

Simplify

1.  $\frac{7}{12} - \frac{5}{6}$

$$\frac{7 \cdot 1}{12 \cdot 1} - \frac{5 \cdot 2}{6 \cdot 2} = \frac{7}{12} - \frac{10}{12}$$

$$\frac{7}{12} - \frac{10}{12} = \frac{-3}{12} = -\frac{1}{4}$$

2.  $\frac{2}{3x} + \frac{1}{x^2}$

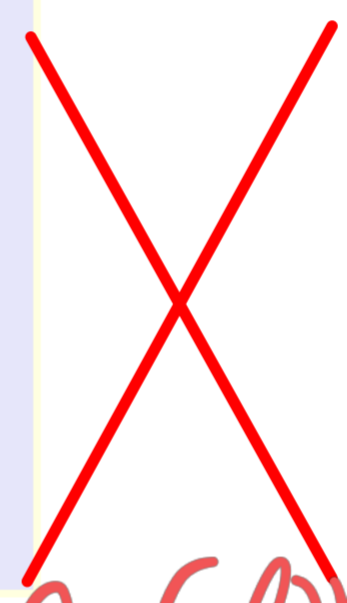
$$\frac{2 \cdot x}{3x \cdot x} + \frac{1 \cdot 3}{x^2 \cdot 3} = \frac{2x}{3x^2} + \frac{3}{3x^2}$$

$$\frac{2x}{3x^2} + \frac{3}{3x^2} =$$

$$\frac{2x + 3}{3x^2}$$

**ERROR ANALYSIS** Describe and correct the error in simplifying  $\frac{1}{3x} - \frac{2}{3}$

$$\begin{aligned} & \frac{1}{3x} - \frac{2}{3} \\ &= \frac{1}{3x} - \frac{2x}{3x} \\ &= \frac{1-2x}{9x^2} \end{aligned}$$



Describe: *Do not change the common denominator.*

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



# Example

Simplify

$$\frac{7}{2x} - \frac{6}{(x-5)}$$

Do not dist.  
denominator

$$\frac{1}{2} + \frac{1}{3} = \frac{1}{6} + \frac{1}{6}$$

only numerator

$$\frac{7(x-5)}{2x(x-5)} = \frac{7x-35}{2x(x-5)}$$
$$- \frac{6 \cdot 2x}{(x-5) \cdot 2x} = \frac{-12x}{2x(x-5)}$$

$$\frac{7x-35}{2x(x-5)} - \frac{12x}{2x(x-5)}$$

$$\frac{-5x-35}{2x(x-5)} = \frac{-5(x+7)}{2x(x-5)}$$

# Example

Simplify

$$\frac{4x}{(x+2)} - \frac{x}{(x-2)}$$

$$12$$

$$6 \cdot 2$$



$$6$$

$$6 \cdot 1$$

$$+ -x$$

$$\frac{4x}{(x+2)}$$

$$= \frac{4x(x-2)}{(x+2)(x-2)}$$

$$- \frac{x}{(x-2)}$$

$$= \frac{-x(x+2)}{(x+2)(x-2)}$$

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

$$\frac{3x^2 - 10x}{(x-2)(x+2)} = \frac{x(3x-10)}{(x-2)(x+2)}$$