2.2B Operations with Rational Expressions (Adding and Subtracting)

A concrete example:

$$\frac{3}{4} + \frac{7}{4}$$

$$= \frac{10}{4}$$

A concrete example:

Ex. 1 Simplify. State restrictions.

a)
$$\frac{3}{y^2} - \frac{2}{y^2} + \frac{6}{y^2}$$

$$= \frac{3 - 2 + 6}{y^2}$$

$$= \frac{7}{4^2} , y \neq 0$$

- 1. Find the lowest common denominator and create equivalent rational expressions.
- 2. Add or subtract the numerators but do not change the denominators.
 - 3. Reduce by any common factors.
 - 4. State the restrictions.

b)
$$\frac{(5x-1)}{2} \frac{(7x+2)^3}{6}$$
 c) $\frac{5}{x^2-4} \frac{3}{4-x^2}$
= $\frac{10x-2}{12} \frac{21x+6}{12}$ = $\frac{5}{x^2-4} \frac{-3}{x^2-4}$
= $\frac{10x-2-(21x+6)}{12}$ = $\frac{5-(-3)}{x^2-4}$ = $\frac{5}{(x+2)(x-2)}$. $=\frac{-11x-8}{12}$

c)
$$\frac{5}{x^2 - 4} - \frac{3}{4 - x^2} \frac{(-1)}{(-1)}$$
 $x^2 - 4$ and $4 - x^2$ are opposites!

$$= \frac{5}{x^2 - 4} - \frac{-3}{x^2 - 4}$$

$$= \frac{5 - (-3)}{x^2 - 4}$$

$$= \frac{8}{(x+2)(x-2)}$$
, $x \neq \pm 2$

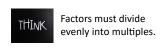
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Finding the LCD

$$\int_{1}^{4x^{3}} = 4 \cdot x \cdot x \cdot x$$

$$8x = 8 \qquad x \cdot x \cdot x$$

$$8x = 8$$



Ex. 2 Simplify and state the restrictions.

a)
$$(4x-1)$$
 $(1+3x)$ $\frac{\chi^{2}}{4x^{3}}$

$$= \frac{2(4x-1)}{8x^{3}} - \frac{(1+3x)}{8x^{3}}^{2}$$

$$= \frac{8x-2 - (x^{2}+3x^{3})}{8x^{3}}$$

$$= \frac{8x-2-x^{2}-3x^{3}}{8x^{3}}$$

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

$$= \frac{7}{8x^{3}}$$

PROCESS

- Find the lowest common denominator and create equivalent rational expressions.
- Add or subtract the numerators but do not change the denominators.
 - 3. Reduce by any common factors.
 - 4. State the restrictions.

b)
$$\frac{4x+4}{5x^2+15x+10} + \frac{1}{x+3} = ACTOR!$$

$$= \frac{4(\chi+1)}{5(\chi^2+3\chi+2)} + \frac{1}{\chi+3}$$

$$(\chi+3) \frac{4(\chi+1)}{(\chi+3)} + \frac{1}{\chi+3} \frac{5(\chi+1)(\chi+2)}{5(\chi+1)(\chi+2)}$$

$$= \frac{4(\chi+1)(\chi+3)}{5(\chi+1)(\chi+2)(\chi+3)} + \frac{5(\chi+1)(\chi+2)}{5(\chi+1)(\chi+2)(\chi+3)}$$

$$= \frac{4(\chi+1)(\chi+3)}{5(\chi+1)(\chi+2)(\chi+3)} + \frac{5(\chi+1)(\chi+2)}{5(\chi+1)(\chi+2)(\chi+3)}$$

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$$= \frac{4(\chi+1)(\chi+3)}{5(\chi+2)(\chi+3)} + \frac{1}{\chi+3}$$

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c)
$$\frac{x-2}{x+1} - \frac{3-12x}{2x^2 - x - 3}$$
 $(2x-3) \frac{x-2}{x+1} - \frac{3(1-4x)}{(2x-3)(x+1)}$
 $= \frac{(2x-3)(x-2)}{(2x-3)(x+1)} - \frac{3(1-4x)}{(2x-3)(x+1)}$
 $= \frac{3}{2} \frac{3(1-4x)}{(2x-3)(x+1)} - \frac{3-12x}{(2x-3)(x+1)}$
 $= \frac{3}{2} \frac{3(1-4x)}{(2x-3)(x+1)} - \frac{3-12x}{(2x-3)(x+1)}$
 $= \frac{3}{2} \frac{3}{2} \frac{3}{2} \frac{3}{2}$
 $= \frac{3}{2} \frac{3}{$

d)
$$\frac{7}{6x-6} + \frac{2x^2}{(x-1)^2} \div \frac{4x}{x^2-1}$$

FIRST

Because BEDMAS

HOMEWORK Pg. 128 # 1ac, 3, 5a, 6ad, 7c, 8b, 10c

+ Additional HW Handout Lesson 2.2B