

LCD

- Factor each denominator
- List the factors
- Determine which are needed to form a common denominator

$$\frac{1}{2x} + \frac{1}{4x} \quad \text{LCD: } 4x$$

$2 \cdot x$
 $2 \cdot \underline{2} \cdot x$ duplicate

$$\textcircled{1} \frac{2}{\cancel{1}x} - \frac{6}{3p^2+12p}$$

$(3p^2+12p) \frac{2}{(3p^2+12p)1} - \frac{6}{3p^2+12p}$

$\frac{6p^2+24p-6}{3p^2+12p} = \frac{6p^2+24p-6}{3p^2+12p}$
 $= \frac{2(p^2+4p-1)}{\cancel{3}p(p+4)}$
 $= \frac{2(p^2+4p-1)}{p(p+4)}$

$\text{LCD: } 3p(p+4)$

$$\textcircled{6} \frac{r-5}{4r+1} - \frac{5x}{4x}$$

$\text{LCD: } \frac{4r+1}{4}$

$$\frac{(4)(r-5)}{(4)(4r+1)} - \frac{(5)(4r+1)}{(4)(4r+1)}$$

$$\frac{4r-20-(20r+5)}{(4)(4r+1)} = \frac{4r-20-20r-5}{(4)(4r+1)}$$

$$= \frac{-16r-25}{(4)(4r+1)}$$

$$\textcircled{8} \frac{2}{\cancel{1}x} - \frac{3x}{3x-4}$$

$\text{LCD: } \frac{x}{3x-4}$

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

$$\frac{6x-8-(3x^2)}{(3x-4)(x)} = \frac{-3x^2+6x-8}{(3x-4)(x)}$$

Complex Fractions

Simplifying a Complex Fraction by Simplifying the Numerator and Denominator

$$16 \frac{1}{5} - \frac{25}{16 \cdot 5}$$

$$\frac{16}{80} - \frac{25}{80}$$

$$\frac{-9}{80}$$

$$\frac{-9}{80} \div \frac{1}{8}$$

$$\frac{-9}{80} \cdot \frac{8}{1}$$

$$\frac{-109}{10}$$

- Create one single fraction in the numerator (if necessary).
- Create one single fraction in the denominator (if necessary).
- Remember the main fraction line means "divide". Rewrite the fraction using a division symbol.
- Follow the normal rules for dividing fractions: Invert the second term (the denominator of the complex fraction) and multiply (by the numerator of the complex fraction).
- Simplify if needed.

Simplifying a Complex Fraction by Multiplying by a Common Denominator

$$\frac{\frac{1}{5} - \frac{25}{16}}{\frac{1}{8}}$$

1. Find the least common denominator (LCD) of all fractions appearing within the complex fraction.
LCD = 80

$$\left(\frac{1}{5} - \frac{25}{16}\right) \cdot \frac{80}{80}$$

$$\frac{80}{5} - \frac{2000}{16}$$

2. Multiply both the numerator and the denominator of the complex fraction by the LCD of the complex fraction from step 1.

$$\frac{80 - 2000}{\frac{80}{8}}$$

3. Simplify whenever possible.

$$\frac{16 - 125}{10}$$

$$\frac{-109}{10}$$

$$\frac{\frac{25}{4} - \frac{1}{16}}{\frac{1}{25}}$$

LCD = 100

$$\frac{625}{4} - \frac{25}{16}$$

$$= \frac{625}{64 + 25} = \frac{625}{89}$$

$$\frac{2x^2 - x^2}{10x}$$

LCD = 10

$$\frac{2x^2 - 10x^2}{10x}$$

$$= \frac{-8x^2}{10x}$$

$$= \frac{-4x}{5}$$

$$\frac{\frac{3}{m} - \frac{3}{m^2}}{\frac{3}{m}}$$

LCD = 3m

$$\frac{27}{m^3 + 3m^2}$$