

Complex Fractions

$$\begin{aligned}\frac{\frac{5x^2}{y}}{\frac{10x}{y^2}} &= \frac{5x^2}{y} \cdot \frac{10x}{y^2} \\ &= \frac{5x^2}{y} \cdot \frac{y^2}{10x} \\ &= \frac{5x^2 y^2}{10xy} \\ &= \frac{1xy}{2} = \frac{xy}{2}\end{aligned}$$

4x and 2

$$\frac{\frac{1}{4x} - \frac{3}{2}}{\frac{3}{1} - \frac{1}{2x}}$$

$$\frac{\left(\frac{4x}{4x}\right) \frac{1}{4x} - \frac{3}{2} \left(\frac{4x}{4x}\right)}{\left(\frac{2x}{2x}\right) \frac{3}{1} - \frac{1}{2x} \left(\frac{2x}{2x}\right)}$$

$$\frac{1 - (3)(2x)}{4x}$$

$$\frac{(2x)(3) - 1}{2x}$$

$$\frac{1 - 6x}{4x}$$

$$\frac{6x - 1}{2x}$$

$$\frac{(1 - 6x)}{4x}$$

$$\frac{-(1 - 6x)}{2x}$$

LCD numerator:

$$4x = 2^2 \cdot x^1$$

$$2 = 2$$

$$\text{LCD: } 2^2 \cdot x = 4x$$

highest power of 2
 * highest power of x

LCD denominator: 2x and 1

Recall

$$a - b = -(b - a)$$

$$\frac{(1-6x)}{4x} \div \frac{-(1-6x)}{2x}$$

$$\frac{(1-6x)}{4x} \cdot \frac{2x}{(-1)(1-6x)}$$

$$\frac{1 \cdot \cancel{2x} \cancel{(1-6x)}}{-2 \cancel{-4x} \cancel{(1-6x)}} = -\frac{1}{2}$$

Method 1 for Simplifying Complex Fractions

1. **Combine** numerators & denominators separately

2. **Divide** resulting fractions

- KCF

$$\frac{4 - \frac{6}{x}}{\frac{2}{x} - \frac{3}{x^2}}$$

$$\frac{\left(4 - \frac{6}{x}\right) \cdot x^2}{\left(\frac{2}{x} - \frac{3}{x^2}\right) \cdot x^2}$$

$$= \frac{4x^2 - \frac{6x^2}{x}}{\frac{2x^2}{x} - \frac{3x^2}{x^2}}$$

$$= \frac{4x^2 - 6x}{2x - 3}$$

$$= \frac{2x \cancel{(2x-3)}}{1 \cdot \cancel{(2x-3)}} = 2x$$

LCD everything.
Note all denominators
 $1, x, x, x^2$

LCD everything. x^2

Method 2

1. LCD of every fraction
2. Multiply both numerator and denominator by LCD
3. Simplify if you can