

October 8, 2012

Section 6.3

Complex Fractions

$$\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$$

Example 1

$$\frac{\frac{3}{4}}{\frac{5}{8}} = \frac{3}{\cancel{4}} \cdot \frac{\cancel{8}^2}{5} = \frac{6}{5}$$

Example 2

$$\frac{\frac{4}{x}}{\frac{12}{y}} = \frac{\cancel{4}^1}{x} \cdot \frac{y}{\cancel{12}_3} = \frac{y}{3x}$$

Example 3

$$\frac{\frac{1}{2} + \frac{2}{3}}{\frac{3}{4} - \frac{1}{3}} =$$

Method #1

lcd num & denom separately
→ convert to $\frac{a}{b}$ format

$$\frac{\frac{1}{2} + \frac{2}{3}}{\frac{3}{4} - \frac{1}{3}} = \frac{\frac{3+4}{6}}{\frac{9-4}{12}} = \frac{7}{6} = \frac{7}{\cancel{6}} \cdot \frac{\cancel{12}^2}{5} = \frac{14}{5}$$

Method #2

- ① need lcd for the entire problem
- ② Multiply all parts (terms) by that lcd

$$\text{lcd} \frac{\frac{1}{2} + \frac{2}{3}}{\frac{3}{4} - \frac{1}{3}} = \frac{\overset{6}{\cancel{2}} \cdot \frac{1}{\cancel{2}} + \overset{4}{\cancel{3}} \cdot \frac{2}{\cancel{3}}}{3 \overset{4}{\cancel{3}} \cdot \frac{3}{\cancel{4}} - \overset{4}{\cancel{3}} \cdot \frac{1}{\cancel{3}}} = \frac{6+8}{9-4} = \frac{14}{5}$$

Example 4

lcd $x(x+1)$ Method 2

$$\frac{\frac{3}{x} + \frac{2}{x+1}}{\frac{5}{x+1} - \frac{3}{x}} = \frac{3(x+1) + 2x}{5x - 3(x+1)} = \frac{3x+3+2x}{5x-3x-3} = \frac{5x-3}{2x-3}$$

Method #1

$$\frac{\frac{3}{x} + \frac{2}{x+1}}{\frac{5}{x+1} - \frac{3}{x}} = \frac{\text{lcd } x(x+1)}{3(x+1) + 2x} = \frac{3x+3+2x}{x(x+1)}$$

$$\frac{5x-3}{x(x+1)} = \frac{5x-3(x+1)}{x(x+1)} = \frac{5x-3x-3}{x(x+1)}$$

$$= \frac{5x-3}{x(x+1)} = \frac{5x-3}{x(x+1)} \cdot \frac{x(x+1)}{2x-3} = \frac{5x-3}{2x-3} \checkmark$$