

Section 2.1 Handout (Complex Fractions Review)

**Method 1:** Simplify the numerator and denominator separately, then rewrite as the division of two fractions. Multiply by the reciprocal of the 2<sup>nd</sup> fraction and simplify.

$$\text{Method 1: } \frac{\frac{x}{3} + \frac{5}{2x}}{\frac{1}{x^2}} = \frac{\frac{2x^2}{6x} + \frac{15}{6x}}{\frac{1}{x^2}}$$

$$= \frac{\frac{2x^2 + 15}{6x}}{\frac{1}{x^2}}$$

$$= \frac{2x^2 + 15}{6x} \div \frac{1}{x^2}$$

$$= \frac{2x^2 + 15}{6x} \cdot \frac{x^2}{1}$$

(cancel the common factor  $x$ ):

$$= \frac{2x^2 + 15}{6x} \cdot \frac{x \cdot x}{1}$$

$$= \frac{x(2x^2 + 15)}{6}$$

**Method 2:** Multiply both numerator and denominator by the least common denominator of all the "little" fractions. This will clear both numerator and denominator of fractions. Simplify.

$$\text{Method 2: } \frac{\frac{x}{3} + \frac{5}{2x}}{\frac{1}{x^2}} = \frac{\left(\frac{x}{3} + \frac{5}{2x}\right)(6x^2)}{\left(\frac{1}{x^2}\right)(6x^2)} \quad \text{LCD is } 6x^2$$

$$= \frac{\frac{x}{3}(6x^2) + \frac{5}{2x}(6x^2)}{\frac{1}{x^2}(6x^2)} \quad \text{Distribute}$$

$$= \frac{2x^3 + 15x}{6}$$

You can write the answer either way.

Simplify the following complex fractions. Use either method 1 or 2.

1)  $\frac{\frac{5x}{7}}{\frac{10x^3}{7}}$

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

3)  $\frac{5 + \frac{2}{3}}{\frac{9}{4}}$

4)  $\frac{2x + \frac{1}{2}}{\frac{2}{4}}$

5)  $\frac{\frac{x+5}{x^2+x-6}}{\frac{1}{x+3}}$

6)  $\frac{\frac{1}{a} + \frac{1}{b}}{a^2 - b^2}$

7)  $\frac{\frac{x+h+2}{3} - \frac{x+2}{3}}{h}$

8)  $\frac{\frac{3}{x+h-1} - \frac{3}{x-1}}{h}$

Answers:

$$1) \frac{1}{2x^2}$$

$$2) \frac{2x-2}{-2x-1} \text{ or } \frac{2-2x}{2x+1}$$

$$3) \frac{68}{27}$$

$$4) \frac{4x+1}{8}$$

$$5) \frac{x+5}{x-2}$$

$$6) \frac{1}{ab(a-b)} \text{ or } \frac{1}{a^2b-ab^2}$$

$$7) \frac{1}{3}$$

$$8) \frac{-3}{(x-1)(x+h-1)}$$