Name______________________________________ Class______________ Date_____________

11-2 & 3 Reteaching

Multiplying and Dividing Rational Expressions

There are many types of *complex fractions*.

A complex fraction can be a fraction with one or more additional fractions in the numerator, or in the denominator, or in both the numerator and the denominator.

Problem

Is $\dfrac{5x^3}{\dfrac{6x^2}{x+1}}$ a complex fraction? Explain.

Solve

Ask: Is the numerator a fraction? → No. $5x^3$ is not a fraction.

Ask: Is the denominator a fraction? → Yes. $\dfrac{6x^2}{x+1}$ is a fraction.

A fraction is in the denominator → $\dfrac{5x^3}{\dfrac{6x^2}{x+1}}$ is a complex fraction.

Exercises

Tell if the following terms are complex fractions. Explain your reasoning.

1. $\dfrac{\dfrac{4y}{5}}{\dfrac{9}{2y}}$

2. $\dfrac{2}{3+8z}$

3. $\dfrac{\dfrac{1}{x+2}}{x-2}$

4. $\dfrac{\dfrac{2x}{3}}{5x}$

5. $\dfrac{\dfrac{3x^2}{x+8}}{x^3}$

6. $\dfrac{\dfrac{4x+9}{2x+8}}{\dfrac{5x-6}{3x+7}}$

7. $\dfrac{\dfrac{x-2}{7}}{x+4}$

8. $\dfrac{\dfrac{2}{x}}{\dfrac{x}{5}}$

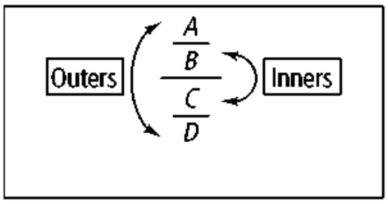
9. $\dfrac{\dfrac{13x^2}{x+2}}{\dfrac{4x^3}{x+16}}$

Simplifying Complex Fractions

You can use the *Outers Over Inners* method to simplify complex fractions.

The Outers Over Inners method sets up a simplified fraction that looks like this:

$$\frac{\text{Product of Outers}}{\text{Product of Inners}} \rightarrow \frac{\text{Outers}}{\text{Inners}} = \frac{AD}{BC}$$



For example, in the fraction: $\dfrac{\frac{6y}{5}}{\frac{2}{4y}}$ and $6y$ are the "outer" terms; 5 and 2 are the "inner" terms.

If a numerator or denominator is not a fraction, make it a fraction by rewriting it as $\dfrac{\text{Polynomial}}{1}$.

Problem

Simplify $\dfrac{\frac{6y}{5}}{\frac{2}{4y}}$.

Solve $\dfrac{\text{Outers}}{\text{Inners}} = \dfrac{(6y)(4y)}{(5)(2)} = \dfrac{24y^2}{10}$

Check Rewrite as numerator divided by denominator. $\dfrac{6y}{5} \div \dfrac{2}{4y}$

Rewrite as a multiplication problem. $\dfrac{6y}{5} \times \dfrac{4y}{2} = \dfrac{24y^2}{10}$

Exercises

Simplify using the Outers Over Inners method.

10. $\dfrac{\frac{(g+4)}{2}}{g}$

11. $\dfrac{\frac{(x+1)}{2}}{\frac{x}{3}}$