Name _____ Class _____ Date _____

Reteaching 11-2

Multiplying and Dividing Rational Expressions

OBJECTIVE: Multiplying and dividing rational expressions

MATERIALS: None

When multiplying rational expressions, look for common factors.

Example

Multiply $\frac{3x - 6}{5x - 20} \cdot \frac{10x - 40}{27x - 54}$.

$$\frac{3x - 6}{5x - 20} \cdot \frac{10x - 40}{27x - 54} = \frac{3(x - 2)}{5(x - 4)} \cdot \frac{10(x - 4)}{27(x - 2)}$$ ← **Factor each expression.**

$$= \frac{\cancel{3}\cancel{(x - 2)}}{\cancel{5}\cancel{(x - 4)}} \cdot \frac{\cancel{10}^{2}\cancel{(x - 4)}}{\cancel{27}_{9}\cancel{(x - 2)}}$$ ← **Divide out common factors and reduce fractions.**

$$= \frac{2}{9}$$ ← **Simplify.**

When dividing rational expressions, multiply by the reciprocal. The reciprocal of a fraction is the fraction with the numerator and denominator interchanged.

Example

Divide $\frac{x^2 + x}{3x - 15} \div \frac{x^2 + 2x + 1}{6x - 30}$.

$$\frac{x^2 + x}{3x - 15} \div \frac{x^2 + 2x + 1}{6x - 30} = \frac{x^2 + x}{3x - 15} \cdot \frac{6x - 30}{x^2 + 2x + 1}$$ ← **Multiply by the reciprocal.**

$$= \frac{x(x + 1)}{3(x - 5)} \cdot \frac{6(x - 5)}{(x + 1)(x + 1)}$$ ← **Factor the numerators and denominators.**

$$= \frac{x\cancel{(x + 1)}}{\cancel{3}\cancel{(x - 5)}} \cdot \frac{\cancel{6}^{2}\cancel{(x - 5)}}{\cancel{(x + 1)}(x + 1)}$$ ← **Divide out common factors.**

$$= \frac{2x}{x + 1}$$ ← **Simplify.**

Exercises

Multiply or divide.

1. $\frac{x^2 - x}{2x + 4} \cdot \frac{x + 2}{x}$

2. $\frac{x^2 + x}{x^2 + 8x + 7} \cdot (x + 7)$

3. $\frac{x^2 - 1}{x^2 + 4x + 3} \div \frac{x - 1}{x^2 + 2x - 3}$

4. $\frac{x^2 - 9}{5x + 15} \div \frac{x - 3}{x + 3}$

5. $\frac{x^2 - x - 30}{6x - 36} \div \frac{5x + 25}{x}$

6. $\frac{x^2 - 9}{x^2 + 4x - 12} \div \frac{x^2 + 2x - 3}{x^2 + 5x - 6}$

© Pearson Education, Inc., publishing as Pearson Prentice Hall. All rights reserved.