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| *Multiplication and Division of Rational Expressions*  **Handout** | **Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Objective: To study multiplication and division of rational expressions.**

**Segment 1**: Definition of rational expressions and their simplification.

A **rational expression**, or algebraic fraction, is a quotient of two polynomials. It can be written in the form, where *P* and *Q* are polynomials and .

A rational expression is in simplest terms if the numerator and denominator do not have any common factors other than 1.

To simplify a rational expression

1. Factor the numerator and denominator completely

2. Divide out all the common factors

**Complete each statement.**

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ expression is a quotient of two polynomials.

A rational expression is in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ if the numerator and denominator have 1 as their only common factor.

To put a rational expression in simplest form, follow these steps:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the numerator and denominator.

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or divide out, common factors.

Example1: Simplify

(a)

(b)

**Segment 2**: Multiplication and division of rational expressions.

Finding the product or quotient of rational expressions is similar to finding the product or quotient of fractions.

**Multiplying Rational Expressions**

- Factor the numerator and denominator of each rational expression, if possible. Divide out, or cancel, common factors.

- Multiply the numerators to get the numerator of the solution.

-Multiply the denominators to get the denominator of the solution.

-Simplify. Remember, try to cross out the common factors before you multiply.

**Dividing Rational Expressions**

- To divide rational expressions, invert the devisor and multiply.

i.e. Multiply the first rational expression by the reciprocal of the second rational expression.

Example 2: Multiply or divide as indicated.

(a) (b)

(c) (d)