

## Performing Operations on Rational Expressions

### Part Two: Quotients

#### Learning Targets

I can:

- determine the non-permissible values when performing operations on rational expressions
- determine, in simplified form, the quotient of rational expressions (AN5.2)

#### Dividing Rational Expressions

Let  $a, b, c,$  and  $d$  represent polynomials.

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc} \text{ where } b \neq 0, c \neq 0, \text{ and } d \neq 0$$

#### Strategy for Dividing Rational Expressions

1. Change the division sign to a multiplication sign and reciprocate the rational expression after the division sign.

*(ie. multiply the first rational expression by the reciprocal of the second rational expression)*

2. Completely factor all polynomial numerators and denominators.
3. State all non-permissible values.
4. Cancel factors that appear in both the numerator and denominator and reduce fractions.

#### Sample Problems

Simplify.

a)  $\frac{25y}{4x^2} \div \frac{35y^8}{32x^5}$

b)  $\frac{42x^2y^3}{-81x^4y^5} \div \frac{49x^4y^2}{18xy}$

c)  $\frac{x^2-3x-40}{14x+2} \div \frac{64-x^2}{7x+1}$

d)  $\frac{x^2-3x-18}{x^2+6x+9} \div \frac{x^2+3x+2}{x^2+8x+15}$

e)  $\frac{14a+6}{6a^2-20a} \div \frac{14a^2+13a+3}{6a^2-17a-10}$