Unit 4 *Module 9.2* *Part 1*	*Rationals*: Operations with Rational Expressions
Objective:	Given a rational expression, students will be able to write equivalent expressions.

objective and corrections

Simplify

1. $\frac{1}{2}+\frac{2}{7}$ $= \frac{1\cdot7}{2\cdot7}+\frac{2\cdot2}{7\cdot2} = \frac{7}{14}+\frac{4}{14} = \frac{11}{14}$

2. $\frac{1}{3}-\frac{2}{5}$ $= \frac{1\cdot5}{3\cdot5}-\frac{2\cdot3}{5\cdot3} = \frac{5}{15}-\frac{6}{15} = -\frac{1}{15}$

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

$\frac{3}{x+5} - \frac{-x}{x-6}$

Vocabulary

Rational Expression: An expression of the form $\frac{p(x)}{q(x)}$ *where p(x) and q(x) are polynomials and q(x) is not zero.*

The excluded values for a rational expression are any values of the variable for which the expression is undefined.

The expressions are equivalent provided they have the same value for every value of the variable unless they are both undefined for that value of the variable.

$\frac{1}{2} = \frac{7}{14}$

$\frac{2}{x} \cdot \frac{2}{2} = \frac{4}{2x}$

$-\frac{1}{(x+3)} \cdot \frac{-5}{-5} = \frac{5}{-5x-15}$

Find an equivalent expression

$\frac{3}{(x+4)} = \frac{12}{4x+16}$

Example

Make equivalent expressions.

$$\frac{1}{x-2} = \frac{?}{(x-2)(x+6)}$$

$$\frac{1(x+6)}{(x-2)(x+6)} = \frac{x+6}{(x-2)(x+6)}$$

What are the excluded values for the simplified expression for which the expression would be undefined?

$x \neq 2$

$x \neq -6$

Example

Make equivalent expressions.

$$\frac{2}{x-9}=\frac{?}{(x-9)(x+4)}$$

$$\frac{2(x+4)}{(x-9)(x+4)}=\frac{2x+8}{(x-9)(x+4)}$$

What are the excluded values for the simplified expression for which the expression would be undefined?

$x \neq 9$

$x \neq -4$

Example

Make equivalent expressions.

$$\frac{-3}{x-4}=\frac{?}{(x-4)(x+6)}$$

$$\frac{-3(x+6)}{(x-4)(x+6)}=\frac{-3x-18}{(x-4)(x+6)}$$

What are the excluded values for the simplified expression for which the expression would be undefined?

$x \neq 4$

$x \neq -6$

Example

Make equivalent expressions.

$$\frac{-x}{x-5} = \frac{?}{(x-1)(x-5)}$$

$$\frac{-x}{x-5} = \frac{-x^2 + ?x}{(x-1)(x-5)}$$

What are the excluded values for the simplified expression for which the expression would be undefined?

$x \neq 1$

$x \neq 5$

Example

Simplify.

$$\frac{x-4}{(x-3)} = \frac{?}{(x-3)(x+2)}$$

What are the excluded values for the simplified expression for which the expression would be undefined?

Example

Simplify.

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

What are the excluded values for the simplified expression for which the expression would be undefined?