

GOAL Simplify rational expressions.

Vocabulary
 A rational expression is an expression that can be written as a ratio of two polynomials. $\frac{x+5}{x^2+bx+7}$
 A rational expression is undefined when the denominator is 0. A number that makes a rational expression undefined is called an **excluded value**.
 A rational expression is in **simplest form** if the numerator and denominator have no factors in common other than 1.

$\frac{6}{x+7}$

EXAMPLE 1 Find excluded values
 Find the excluded values, if any, of the expression.

a. $\frac{8}{-2x}$ E.V. = 0

b. $\frac{x}{3x-9}$ E.V. = 3

c. $\frac{x+2}{x^2+2x-15}$
 $(x+5)(x-3)$
 E.V. = 3, -5

d. $\frac{x+6}{x^2+4x-12}$
 $(x+6)(x-2)$
 E.V. = -6, 2

Example 2 – Simplify expressions, if possible. State the excluded values.

$\frac{(x+3)}{(x+6)}$
 $\frac{x+3}{x+6}$
 E.V. = -6

$\frac{10x}{35} \div 5$
 $\frac{2x}{7}$
 E.V.: None

$\frac{2x-14}{7-x}$
 $\frac{2(x-7)}{-1(x-7)}$
 $\frac{-2}{-1}$
 E.V.: 7

4. $\frac{-24y^3}{32y^2} \div 8y^2$
 $\frac{-3y}{4}$
 E.V. = 0

5. $\frac{x-5}{x^2-25}$
 $\frac{x-5}{(x+5)(x-5)}$
 $\frac{1}{x+5}$
 E.V. = 5, -5

6. $\frac{x^2-3x-10}{x^2-4x-12}$
 $\frac{(x-5)(x+2)}{(x-6)(x+2)}$
 $\frac{x-5}{x-6}$
 E.V.: 6, -2

7. $\frac{2x^2+5x+3}{-2x-3}$
 $\frac{(2x+3)(x+1)}{-1(2x+3)}$
 $\frac{x+1}{-1}$
 $-(x+1)$
 $\frac{-x-1}{-1}$
 E.V. = -1/2

8. $\frac{-48w}{16w^2-40w}$
 $\frac{-48w}{8w(2w-5)}$
 $\frac{-6}{2w-5}$
 E.V. = 5/2, 0

$-2x-3=0$
 $-2x=3$
 $x=-1\frac{1}{2}$