

Section 7.1: RATIONAL EXPRESSIONS AND THEIR SIMPLIFICATION

When you are done with your homework you should be able to...

- π Find numbers for which a rational expression is undefined
- π Simplify rational expressions
- π Solve applied problems involving rational expressions

WARM-UP:

1. Factor:

$$x^3 - 8x^2 + 2x - 16$$

2. Solve:

$$2x^2 - x - 10 = 0$$

EXCLUDING NUMBERS FROM RATIONAL EXPRESSIONS

A _____ expression is the _____ of two _____
_____. Rational expressions indicate _____
and division by _____ is _____. This means that we
_____ any value or values of the _____
that make a _____!

Example 1: Find all numbers for which the rational expression is undefined:

a. $\frac{5}{x}$

b. $\frac{x+1}{x-4}$

c. $\frac{8x-40}{x^2+3x-28}$

d. $\frac{x-12}{x^2+4}$

SIMPLIFYING RATIONAL EXPRESSIONS

A _____ is _____ if its
 _____ and _____ have _____ common
 _____ other than _____ or _____.

FUNDAMENTAL PRINCIPLE OF RATIONAL EXPRESSIONS

If _____, _____, and _____ are _____ and _____ and _____
 are _____,

STEPS FOR SIMPLIFYING RATIONAL EXPRESSIONS

1. _____ the _____ and the _____ completely.
2. _____ both the _____ and the _____ by any _____.
3. _____ the _____ in the _____ equation.

Example 2: Simplify:

a. $\frac{4x-64}{16x}$

b. $\frac{6y+18}{11y+33}$

c. $\frac{x^2-12x+36}{4x-24}$

d. $\frac{x^3 + 4x^2 - 3x - 12}{x + 4}$

e. $\frac{x + 5}{x - 5}$

f. $\frac{x^3 - 1}{x^2 - 1}$

SIMPLIFYING RATIONAL EXPRESIONS WITH OPPOSITE FACTORS IN THE NUMERATOR AND DENOMINATOR

The _____ of two _____ that have _____ signs and are _____ is _____.

Example 3: Simplify:

a. $\frac{x-3}{3-x}$

b. $\frac{9x-15}{5-3x}$

c. $\frac{x^2-4}{2-x}$

APPLICATION

A company that manufactures small canoes has costs given by the equation

$$C = \frac{20x + 20000}{x}$$

in which x is the number of canoes manufactured and C is the cost to manufacture each canoe.

- Find the cost per canoe when manufacturing 100 canoes.
- Find the cost per canoe when manufacturing 10000 canoes.
- Does the cost per canoe increase or decrease as more canoes are manufactured?