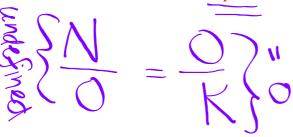
# 12.2 Rational Expressions

A *rational* expression is an algebraic fraction whose numerator and denominator are polynomials.

**Excluded values**: Values that the variable would take on in the denominator that would make the denominator equal 0. Division by zero is undefined.



Apr 27-9:48 AM

# What can denominators not equal, EVER?

State the excluded values for each rational expression.

$$\frac{6}{x-3} \quad \frac{x-3}{x+3} = 0$$

$$x \neq 3$$

$$x \neq 3$$

$$\frac{x+4}{3x+7} \quad \frac{3x+7 \neq 0}{\cancel{3}\cancel{x} \neq -7}$$

$$\cancel{\cancel{3}\cancel{x} \neq -7}$$

$$\cancel{\cancel{3}\cancel{x} \neq -7}$$

$$\cancel{\cancel{3}\cancel{x} \neq -7}$$

$$\frac{2x}{x^{2}-4} = 0$$

$$\frac{x^{2}-4}{\sqrt{x^{2}-4}} = 0$$

$$x+2 = 0$$

$$x+3 = 0$$

$$x+4 = 0$$

$$\frac{3x+5}{x^{2}-5x+6}$$

$$(x-3)(x-2) \neq 0$$

$$x-3\neq 0 \quad x-2\neq 0$$

$$x\neq 3 \quad x\neq 2$$

#### 12.2 Simplifying Rational Expression Notes with work

#### REVIEW

Simplify each rational number.

$$\frac{4}{6} \stackrel{?}{=} 2 = \boxed{\frac{2}{3}}$$

$$\frac{24 \div 12}{36 \div 12} = \frac{2}{3}$$

$$\frac{12 \div 3}{15 \div 3} = \boxed{\frac{4}{5}}$$

$$\frac{16 \div 8}{40 \div 8} = \boxed{\frac{2}{5}}$$

Apr 27-9:41 AM

**Examples:** 

Simplify each rational expression. State all excluded values for each.

8 
$$\frac{32x^5y^2}{4x^2y^7} = 8x^5 - y^2 = 8x^4 - y^2$$

Apr 28-8:03 AM

#### 12.2 Simplifying Rational Expression Notes with work

### More Examples:

Simplify each rational expression. State all excluded values for each.

$$\frac{4x+8}{x^{2}+6x+8} = \frac{4(x+2)}{(x+4)(x+2)} = \frac{4}{(x+4)}$$

$$\frac{m^{2}-36}{m^{2}-5m-6} = \frac{(m+6)(m+6)}{(m+6)(m+1)} = \frac{m+6}{m+1}$$

$$\frac{x^{2}-x-20}{x^{3}+10x^{2}+24x} = \frac{(x-5)(x+4)}{x(x+6)(x+4)} = \frac{x-5}{x(x+6)}$$

$$x \neq 0, -6, -4$$

$$x \neq 0, x+6 \neq 0, x+4 \neq 0$$

Apr 28-8:08 AM

### Common Mistakes:

- Do NOT cancel a term. Factors cancel.
- Write your excluded values BEFORE you cancel factors out.
- Do NOT factor wrong. Check with FOIL!

On a separate slip of paper,

Write a summary of what you learned today. Put your name on it and set it on my desk! Then grab your worksheet.

## 12.2 WS

- A) 1, 3, 6, 7, 13, 16, 17, 18, 19
- B) odds
- C) 1, 2, 4, 5, 8, 9, 11, 13, 16, 19