

## Notes # 1 Review Factoring/Simplify Rational Expressions

Greatest Common Factor

Usually when there are only **2 terms**

**Sometimes it's a #**

$$\textcircled{1} \quad 2x + 8$$

$$2(x + 4)$$

$$\textcircled{2} \quad 5x + 15$$

$$5(x + 3)$$

try these:

$$\textcircled{3} \quad 6x - 36$$

$$6(x - 6)$$

$$\textcircled{4} \quad 7x + 42$$

$$7(x + 6)$$

**Sometimes it's a variable**

$$\textcircled{5} \quad x^2 + 10x$$

$$x \cancel{x} + 10 \cancel{x}$$

$$x(x + 10)$$

don't have a # in common

$$\textcircled{6} \quad 5x^2 - 7x$$

$$x(5x - 7)$$

5 + 7 nothing in common

Factoring trinomials  $a=1$ 

P	S

P	
	S

$$\textcircled{1} \quad x^2 - 2x - 35$$

$$(x+5)(x-7)$$

multiplies  
~~5   -35~~  
~~-7   -2~~  
 adds to

try these:

$$\textcircled{2} \quad x^2 + 16x + 60$$

$$(x+10)(x+6)$$

$$\textcircled{3} \quad x^2 - 3x - 18$$

$$(x-6)(x+3)$$

$$\textcircled{4} \quad x^2 - 16$$

$$(x+4)(x-4)$$

~~+4   -16~~  
~~0   -4~~

$$\textcircled{5} \quad 9x^2 - 25$$

$$3 \cdot 3 \cdot x \cdot x + 5 \cdot -5$$

$$(3x+5)(3x-5)$$

Factoring trinomials  $a > 1$ when there is a #  $x^2$ 

$$\textcircled{1} \quad \textcircled{2}x^2 + 11x + \textcircled{14}$$

$$\downarrow \quad \downarrow$$

$$2x^2 + 4x \quad + 7x + 14$$

$$2x(x+2) + 7(x+2)$$

match

$$(x+2)(2x+7)$$

~~7   28~~  
~~11   4~~

try this:

$$\textcircled{4}x^2 + 13x + \textcircled{10}$$

$$\downarrow \quad \downarrow$$

$$4x^2 + 8x \quad + 5x + 10$$

$$4x(x+2) + 5(x+2)$$

$$(4x+5)(x+2)$$

~~8   40~~  
~~13   5~~

## Simplify Rational Expressions

Rational  $\rightarrow$  FRACTION

$$\textcircled{1} \quad \frac{x^2 - 3x - 4}{x^2 - 2x - 8}$$

FACTOR FIRST!  
top and bottom

You CANNOT just cross stuff out.

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

now I can simplify  
match top  
bottom

$$\boxed{\frac{x+1}{x+2}}$$

Simplified answer

$$\textcircled{2} \quad \frac{x^2 - 49}{x^2 - 2x - 35}$$

Factor

$$\frac{(x+7)(x-7)}{(x-7)(x+5)}$$

looking for match  
top  
bottom

$$\boxed{\frac{x+7}{x+5}}$$

try this:

$$\frac{x^2 - 6x + 8}{x^2 + 2x - 24}$$

$$\frac{(x-4)(x-2)}{(x+6)(x-4)}$$

$$\boxed{\frac{x-2}{x+6}}$$