

## Factoring Practice:

1.)  $x^2 - 2x - 48$

$$\begin{array}{c} \wedge \\ 6 \quad -8 \\ (x+6)(x-8) \end{array}$$

2.)  $10x - 5x^2$

$$5x(2-x)$$

3.)  $x^2 - 16$   $(x+4)(x-4)$

4.)  $3x^2 + 16x + 5$

$$\begin{array}{c} 15 \\ \wedge \\ 15 \quad 1 \end{array}$$

$$\begin{array}{l} (3x^2 + 15x)(x+5) \\ 3x(x+5) + 1(x+5) \end{array}$$

$$(x+5)(3x+1)$$

5.)  $2x^2 - x - 10$

$$\begin{array}{c} 20 \\ \wedge \\ 4 \quad -5 \end{array}$$

$$\begin{array}{l} (2x^2 + 4x)(-5x - 10) \\ 2x(x+2) - 5(x+2) \end{array}$$

$$(2x-5)(x+2)$$

## 8.4: Multiply & Divide Rational Expressions

### Basic Simplifying Rules:

$$\text{a) } \frac{ax}{bx} = \frac{a}{b}$$

$$\text{b) } \frac{3x^2}{5x^2} = \frac{3}{5}$$

$$\text{c) } \frac{2x}{x^3} = \frac{2}{x^2}$$

$$\text{d) } \frac{x+3}{x} = \frac{x+3}{x}$$

$$\text{e.) } \frac{4x+12}{2x+6} = \frac{4(x+3)}{2(x+3)} = 2$$

## Excluded Values:

-What numbers will make the expression undefined

example:  $\frac{5x}{x+3}$

$$\frac{0}{k} \quad \frac{N}{0} = \emptyset$$

Set denominator = 0

$$x + 3 = 0$$

$$x \neq -3$$

Ex) Simplify, and state the excluded values

$$A) \frac{7x - 21}{x - 3} = \frac{7(x - 3)}{\cancel{x - 3}} = \boxed{7}$$

Excluded Value:

$$x - 3 = 0$$
$$\boxed{x \neq 3}$$

$$B) \frac{x^2 - 9x + 14}{x^2 - 5x - 14} = \frac{\cancel{(x-7)}(x-2)}{\cancel{(x-7)}(x+2)} \leftarrow$$

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

Excluded Value

$$x-7=0$$

$$x+2=0$$

$$x \neq 7, -2$$

$$\text{C) } \frac{x^2 + 2x - 24}{x^2 + 7x + 6}$$
$$\frac{(x+6)(x-4)}{(x+6)(x+1)}$$
$$\frac{x-4}{x+1}$$

Ex) Multiply

$$A) \frac{5x^3y}{x^2y^2} \cdot \frac{y^3}{3x}$$

Handwritten diagram showing the cancellation of variables in the multiplication of two fractions. The numerator is  $5x^3y$  and the denominator is  $3x^2y^2$ . A horizontal line is drawn through the variables. Three 'x's in the numerator and two 'x's in the denominator are crossed out with diagonal lines. One 'y' in the numerator and two 'y's in the denominator are also crossed out with diagonal lines. The remaining '5' in the numerator and '3' in the denominator are not crossed out.

$$\frac{5y^2}{3}$$

$$B) \frac{x^2 - 3x}{x - 2} \cdot \frac{x^2 + x - 6}{x}$$

$$\frac{\cancel{x}(x-3)}{\cancel{x-2}} \cdot \frac{(x+3)\cancel{(x-2)}}{\cancel{x}}$$

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



$$C) \frac{x^2 + 3x - 4}{x^2 + 4x + 4} \cdot \frac{2x^2 + 4x}{x^2 - 4x + 3}$$

$$\frac{(x+4)(\cancel{x-1})}{(x+2)(\cancel{x+2})} \cdot \frac{2x(\cancel{x+2})}{(x-3)(\cancel{x-1})}$$

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

$$D) \frac{x^2 + 5x - 36}{x^2 - 49} \cdot \frac{x^2 - 11x + 28}{1}$$

$$\frac{(x+9)(x-4)}{(x+7)(x-7)} \cdot \frac{(x-7)(x-4)}{1}$$

$$\frac{(x+9)(x-4)^2}{x+7}$$

Dividing

-Flip 2nd term, then multiply.

Ex) Divide

$$A) \frac{(x+3)(x-2)}{x(x+1)} \div \frac{x+3}{x}$$

$$\frac{\cancel{(x+3)}(x-2)}{\cancel{x}(x+1)} \cdot \frac{\cancel{x}}{\cancel{x+3}}$$

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

