

## DOMAIN

ex.  $\frac{x^2 + 2x + x}{x^2 - 2x - 8}$

ex.  $\frac{\sqrt{x+4}}{x^3 - x}$

- DENOMINATORS CANNOT EQUAL 0
- CANNOT TAKE  $\sqrt{\quad}$  OF NEGATIVE #'S

## SIMPLIFYING RATIONAL EXPRESSIONS

ex.  $\frac{x^2 + 10x + 25}{3x^4 + 15x^3}$

$$\frac{AC}{BC} = \frac{A}{B}$$

ex. What is WRONG WITH THIS?

$$\frac{\cancel{x^2} - 1}{\cancel{x^2} + x - 2} = \frac{-1}{x - 2} \quad (\otimes)$$

$$\hookrightarrow \frac{(x+1)\cancel{(x-1)}}{(x+2)\cancel{(x-1)}} = \frac{x+1}{x+2} \quad (\checkmark)$$

ex.  $\frac{4x^3 + 4x^2}{2x^3 + 4x^2 + 2x}$

## MULTIPLYING & DIVIDING RATIONAL EXPRESSIONS

Note:  $\frac{24}{25} \cdot \frac{5}{12} = \frac{(2)(12)}{(5)(5)} \cdot \frac{\cancel{5}}{\cancel{12}} = \frac{2}{5} \quad (\checkmark)$

ex.  $\frac{x^2 - 4}{x^2 + 6x + 9} \cdot \frac{x^2 + 4x + 3}{x^2 + 3x + 2}$

ex.  $\frac{x-4}{x^2-4} \div \frac{x^2-3x-4}{x^2+5x+6}$

## ADDING & SUBTRACTING RATIONAL EXPRESSIONS

Note:  $\frac{5}{18} + \frac{11}{75} = \frac{5}{2 \cdot 3^2} + \frac{11}{3 \cdot 5^2}$

$$\text{LCD} = 2 \cdot 3^2 \cdot 5^2 = 450$$
$$= \frac{5}{2 \cdot 3^2} \cdot \frac{5^2}{5^2} + \frac{11}{3 \cdot 5^2} \cdot \frac{2 \cdot 3}{2 \cdot 3} = \frac{125 + 66}{450}$$

ex.  $\frac{2}{2x+3} + \frac{5}{3x-2}$

- ① FACTOR ALL NUM. & DENOM. (SIMPLIFY FRACTIONS BEFORE ADD/SUB IF POSSIBLE)
- ② LCD IS PRODUCT OF ALL FACTORS IN DENOM. RAISED TO THE HIGHEST EXPONENT.

(COMMON MULTIPLE, NOT COMMON FACTOR)

- ③ MULTIPLY TOPS & BOTTOMS BY MISSING FACTORS TO MAKE ALL DENOM. EQUAL TO LCD.

ex.  $\frac{1}{x^2-1} - \frac{1}{x^2+2x+1}$

ex. 55.  $\frac{2}{x} + \frac{3}{x-1} - \frac{4}{x^2-x}$

ex. 58.  $\frac{1}{x+1} - \frac{2}{(x+1)^2} + \frac{3}{x^2-1}$

### SIMPLIFYING A COMPOUND FRACTION

60.  $\frac{1 - \frac{2}{y}}{\frac{3}{y} - 1}$

64.  $\frac{\frac{x-3}{x-4} - \frac{x+2}{x+1}}{x+3}$

Simplify:  $\frac{(1+x^2)^{1/2} - x^2(1+x^2)^{-1/2}}{1+x^2}$