

NOTES - OPERATIONS WITH RATIONAL FUNCTIONS - DAY 1 (MULTIPLYING AND DIVIDING)

GOAL: TO BE ABLE TO SIMPLIFY AND/OR COMPLETE THE GIVEN OPERATION FOR THE RATIONAL FUNCTION.
TO BE ABLE TO STATE WHEN A RATIONAL FUNCTION IS UNDEFINED

EXAMPLE 1

$$\frac{c^2 - 3c}{c^2 - 25} \cdot \frac{c^2 + 4c - 5}{c^2 - 4c + 3}$$

* FACTOR EACH
NUMERATOR
AND DENOMINATOR.
CROSS OUT
COMMON FACTORS

$$\frac{\cancel{c}(\cancel{c-3})}{(\cancel{c+5})(c-5)} \cdot \frac{(\cancel{c+5})(c-1)}{(\cancel{c-3})(c-1)}$$

$$\boxed{\frac{c}{(c-5)}}$$

STEPS

- ① FACTOR EVERYTHING (IF POSSIBLE)
- ② FOLLOW RULES FOR MULTIPLYING AND DIVIDING FRACTIONS
- ③ CROSS OUT ANY COMMON FACTORS

EXAMPLE 2

$$\frac{3x^2 - 3}{2x^2 + 8x + 6} \div \frac{5x^2 - 10x + 5}{4x + 12}$$

$$\frac{3(x+1)(x-1)}{2(x+1)(x+3)} \div \frac{5(x-1)(x-1)}{4(x+3)}$$

$$\frac{3(\cancel{x+1})(x-1)}{2(\cancel{x+1})(x+3)} \cdot \frac{4(x+3)}{5(x-1)(\cancel{x-1})}$$

$$\frac{3}{2} \cdot \frac{4}{5(x-1)}$$

$$\frac{12}{10(x-1)}$$

SIMPLIFY MORE →

$$\boxed{\frac{6}{5(x-1)}}$$

REMEMBER... YOU CAN'T DIVIDE FRACTIONS, YOU MULTIPLY BY ITS RECIPROCAL

THEN CROSS OUT COMMON FACTORS