TOPIC: INTRODUCTION TO RATIONAL FUNCTIONS

Introduction to Rational Functions

- A **rational function** has a _____ in the numerator & denominator: $f(x) = \frac{x^2+4x+1}{3x+2}$ $= \frac{p(x)}{q(x)}$
  - Recall: The denominator of a fraction ***CANNOT*** be _____.

Rational ***Equation***	Rational ***Function***
$12 = \frac{1}{\underbrace{x-1}_{\neq 0}}$	$f(x) = \frac{1}{\underbrace{x-1}_{\neq 0}}$
Restriction: $x \neq$ ____	Domain: $\{x \mid x \neq$ ____$\}$

- To determine domain, set denominator = 0 & solve for x. Domain is any real #, *EXCEPT* what makes denom $= 0$.
- To write a rational function in **lowest terms,** factor top & bottom, then _____ any common factors.
  - Always find the domain *BEFORE* writing in lowest terms.

EXAMPLE: Find the domain of the rational function. Then, write the function in lowest terms.

(A)	(B)
$f(x) = \frac{3}{3x+12}$	$f(x) = \frac{x+5}{x^2-25}$
$\{x \mid x \neq$ _____$\}$	$\{x \mid x \neq$ _____$\}$
$f(x) = \frac{3}{3x+12}$	$f(x) = \frac{x+5}{x^2-25}$

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PRACTICE: Find the domain of the rational function. Then, write it in lowest terms.

$f(x) = \frac{x^2+9}{x-3}$ $\{x|x \neq \_\_\_\_\_\}$

PRACTICE: Find the domain of the rational function. Then, write it in lowest terms.

$f(x) = \frac{6x^5}{2x^2-8}$ $\{x|x \neq \_\_\_\_\_\}$