MAC 1105 Pre-Class Assignment (due 6/3 by 11:59pm):

Rational functions

Rational functions are quotients of polynomial functions.
This means that all rational functions can be expressed as

$$f(x) = \frac{p(x)}{q(x)}$$

where *p(x)* and *q(x)* are ________ functions and *q(x)*$\neq$ 0.

Look in your textbook (Chapter 3.5) to fill in the blank above.

1. In the definition of a rational function above, why is q(x)$\neq$ 0?

2. The function $f(x) = \frac{2x^2-5x+7}{x-2}$ is a rational function whose numerator is ______________ and denominator is___________.

The **domain** of a rational function is the set of all real numbers except the *x*-values that make the denominator zero.

3. For the function $g(x) = \frac{x}{x^2 - 25}$.

a. What is the polynomial of the denominator of the function?

b. How can we find the values of x that make the denominator zero?

c. Would you be able to find the x-values that make the denominator zero if you factored the denominator and set it equal to zero?

d. What are the x-values that make the denominator zero?

Since the domain of a rational function is the set of all real numbers <u>except</u> the *x*-values that make the denominator zero.

e. Is it true that we should EXCLUDE from the domain the x-values we found?

f. Therefore, the domain of g consists of all real numbers except ___and ____.

g. Hence the domain can be expressed in

- set notation as $\{x \mid x \neq \_\_, \ x \neq \_\_\_\}$ or
- interval notation as $(-\infty, \_\_\_) \cup (\_\_, \_\_) \cup (\_\_, \infty)$

4. What is the domain of $h(x) = \frac{x^2-4}{x-2}$?

a. Is there a common factor in the numerator and denominator of $h(x)$?

b. If so, (i) Can the function be simplified?

(ii) What is the simplified function?

c. Does this affect the domain?