3. Liza rewrites the rational expression as shown. Describe the error in Liza's reasoning.

Liza

$\frac{x^2 + 4x + 3}{4x + 3} = x^2$

I divided out the common factors. The numerator and denominator each have a 4x and a 3, so I am left with the squared term.

4. Rewrite each rational function by dividing out common factors. List any restrictions on the domain.

a. $f(x) = \frac{2x^2 - 8}{x - 2}$

b. $f(x) = \frac{3xy - 3y}{x^2 - 1}$

c. $f(x) = \frac{x^2 - 5x + 6}{3x - 9}$

d. $f(x) = \frac{x^3 - 7x^2 - 18x}{3x^2 - 9x}$

e. $f(x) = \frac{25x^2 - 9}{5x^2 - 12x - 9}$

f. $f(x) = \frac{x^3 - 5x^2 - x + 5}{x^2 - 6x + 5}$

5. Consider how Forrest rewrote the expression $\frac{x - 2}{x - 1}$. Describe the error in Forrest's reasoning.

Forrest

I divided out the in the numerator x-1 and denominator.

$\frac{\cancel{x} - 2}{\cancel{x} - 1} = \frac{-2}{-1} = 2$

ACTIVITY
3.3

Sketching Discontinuous Functions

You have analyzed rational functions with asymptotes, and you have analyzed rational functions with discontinuities. Now let's consider functions that may have both.

1. Determine whether the graph of the rational function has a vertical asymptote, a removable discontinuity, both, or neither. List the discontinuities and justify your reasoning.

a. $j(x) = \frac{x + 2}{x(x + 2)}$

b. $h(x) = \frac{x}{x + 5}$

c. $k(x) = \frac{5}{5(x + 2)}$

d. $m(x) = \frac{x + 2}{x^2 - 2x - 15}$

2. Write two examples of rational functions with one or more removable discontinuities. Explain your reasoning.

3. Write a unique function that has a vertical asymptote and a removable discontinuity. Explain your reasoning.