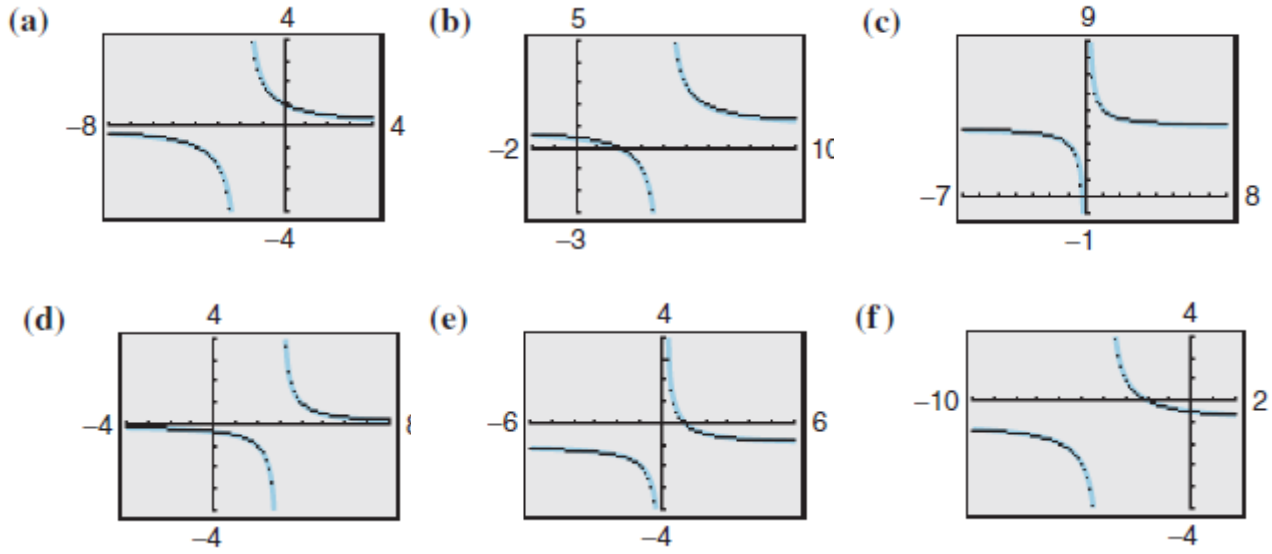
Name_____

Precalculus Unit 3: 3.1 Homework
Rational Functions and Asymptotes

Match each function with its graph.



1. $f(x) = \frac{2}{x+2}$

2. $f(x) = \frac{1}{x-3}$

3. $f(x) = \frac{4x+1}{x}$

4. $f(x) = \frac{1-x}{x}$

5. $f(x) = \frac{x-2}{x-4}$

6. $f(x) = \frac{-x-2}{x+4}$

For each of the following functions, find the domain, vertical asymptotes / holes, and horizontal asymptotes. **Provide supporting work**.

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

Domain:

Vertical Asymptote(s):

Hole(s):

Horizontal Asymptote:

8. $f(x) = \frac{-5x^2-14x+3}{2x^2+7x+3}$

Domain:

Vertical Asymptote(s):

Hole(s):

Horizontal Asymptote:

9. $f(x) = \frac{3x^2+1}{x^2+x+9}$

Domain:

Vertical Asymptote(s):

Hole(s):

Horizontal Asymptote:

10. The cost *C* (in millions of dollars) of removing *p%* of the industrial and municipal pollutants discharged into a river is given by $C = \frac{255p}{100-p}$, $0 \leq p < 100$.

    a.) Find the cost of removing 10% of the pollutants.

    b.) Find the cost of removing 75% of the pollutants.

    c.) According to this model, would it be possible to remove 100% of the pollutants? Why or why not?

11. The game commission introduces 100 deer into newly acquired state game lands. The population *N* of the herd is given by $N = \frac{100+60t}{1+0.04t}$, $t > 0$ where *t* is time in years.

    a.) Use a graphing utility to graph the model. Draw a sketch here.

    b.) Find the populations when $t = 5, t = 10, and\ t = 25$.

    c.) What is the limiting size of the herd as time increases? How did you determine this?