

### 3.1 Practice Problems

Name \_\_\_\_\_

*Determine the domain, vertical asymptotes, and end-behavior asymptotes for each of the following functions.*

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

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

2.  $g(x) = \frac{x-1}{x^2-9}$

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

3.  $m(x) = \frac{2x}{x+3}$

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

4.  $p(x) = \frac{x^2+4}{x-1}$

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

5.  $r(x) = \frac{2}{(x+1)^2}$

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

6.  $t(x) = \frac{2x^2}{x^2+2x-8}$

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

$$7. k(x) = \frac{x^2-1}{x+2}$$

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

$$8. v(x) = \frac{2x+1}{3x-4}$$

Domain:

Vertical Asymptote(s):

End Behavior Asymptote:

*For both of the functions, determine the domain, vertical asymptotes, end-behavior asymptotes, and state where the graph will have a hole.*

$$9. j(x) = \frac{x+3}{x^2+2x-3}$$

Domain:

Vertical Asymptote(s):

Hole:

End Behavior Asymptote:

$$10. q(x) = \frac{x^3-1}{x^2+x-2}$$

Domain:

Vertical Asymptote(s):

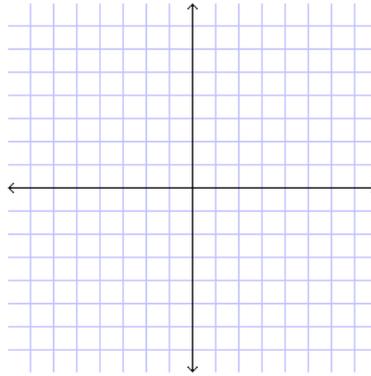
Hole:

End Behavior Asymptote:

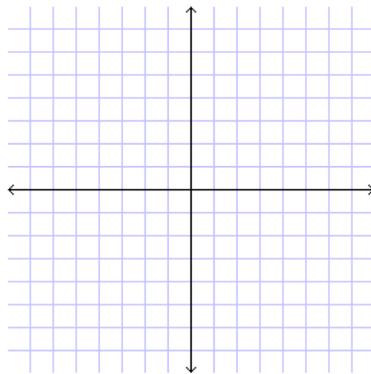
### 3.2 Practice Problems

Graph each of the following rational functions. Using the information from the practice problems from Section 3.1, draw all of the asymptotes. Find and plot all intercepts. If the end-behavior asymptote is not the  $x$ -axis, make sure to check if the graph touches the end-behavior asymptote.

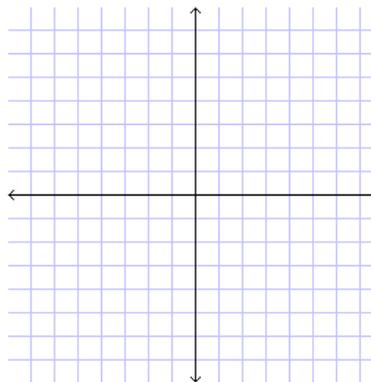
1.  $f(x) = \frac{3}{x-2}$



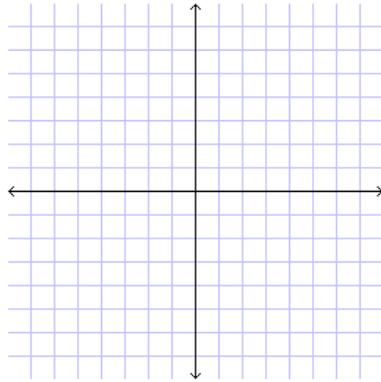
2.  $g(x) = \frac{x-1}{x^2-9}$



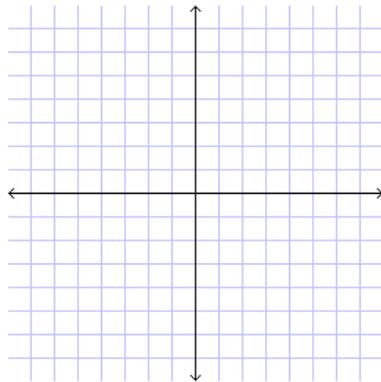
3.  $m(x) = \frac{2x}{x+3}$



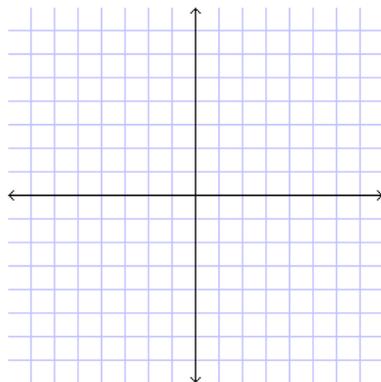
4.  $p(x) = \frac{x^2+4}{x-1}$



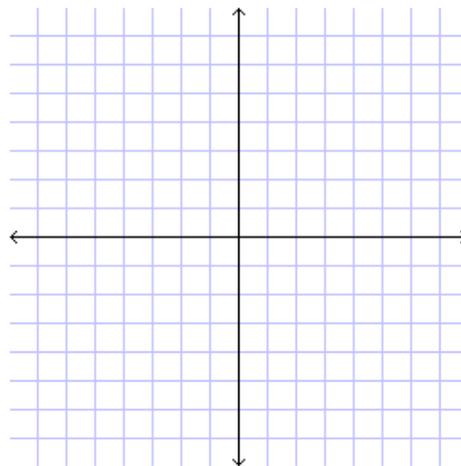
5.  $r(x) = \frac{2}{(x+1)^2}$



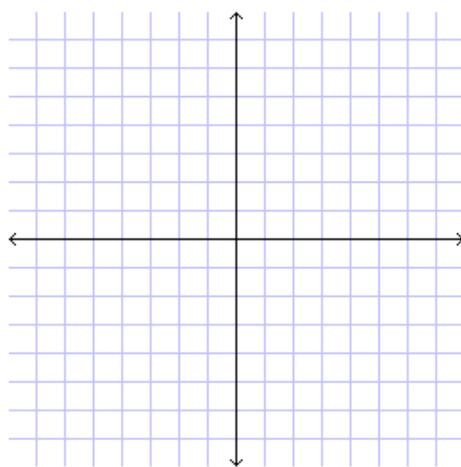
6.  $t(x) = \frac{2x^2}{x^2+2x-8}$



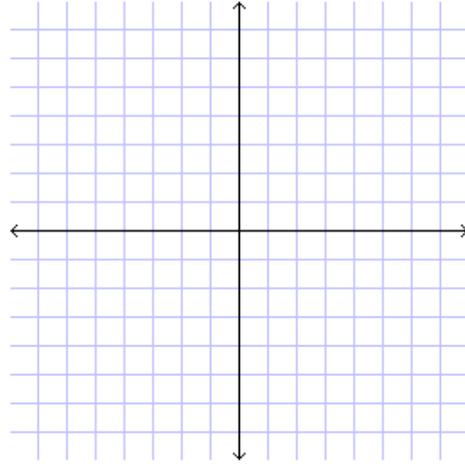
$$7. k(x) = \frac{x^2-1}{x+2}$$



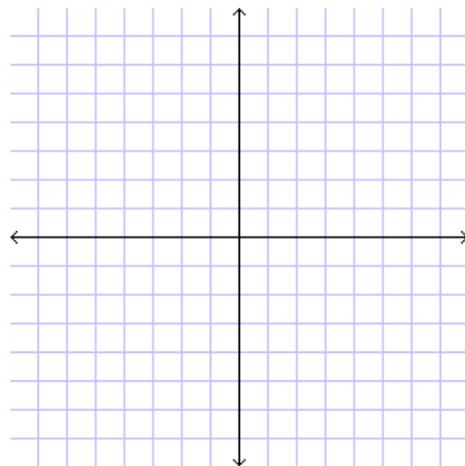
$$8. v(x) = \frac{2x+1}{3x-4}$$



$$9. j(x) = \frac{x+3}{x^2+2x-3}$$



$$10. q(x) = \frac{x^3-1}{x^2+x-2}$$



### 3.3 Practice Problems

Using the graphs from the first four problems from Section 3.2 homework, solve each of the following inequalities. State your answer in interval notation.

1.  $\frac{3}{x-2} > 0$

2.  $\frac{x-1}{x^2-9} \leq 0$

3.  $\frac{2x}{x+3} \leq 0$

4.  $\frac{x^2+4}{x-1} \geq 0$

Solve each of the following rational inequalities.

5.  $\frac{4}{(x-1)^2} \leq 0$

6.  $\frac{x^2}{x^2-5x-6} > 0$

$$7. \frac{(x-1)(3x+2)}{(x+5)(x-4)} \leq 0$$

$$8. \frac{x}{x-3} \geq 2$$

$$9. \frac{3x}{x+2} < \frac{2x}{x-1}$$

## Chapter 3 Practice Test

1. Determine the domain for each of the following rational functions.

a.  $f(x) = \frac{3x}{x^2-16}$

b.  $g(x) = \frac{x+1}{2x-5}$

c.  $q(x) = \frac{x^2-4}{x+1}$

d.  $p(x) = \frac{x^2+2x+1}{x^2+5}$

2. Determine the vertical asymptotes and end-behavior asymptotes for each of the following rational functions:

a.  $f(x) = \frac{3x}{x^2-16}$

b.  $g(x) = \frac{x+1}{2x-5}$

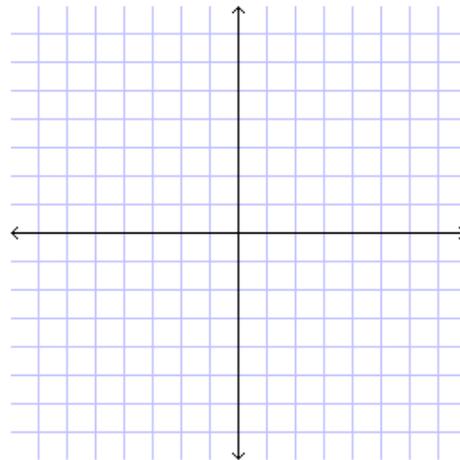
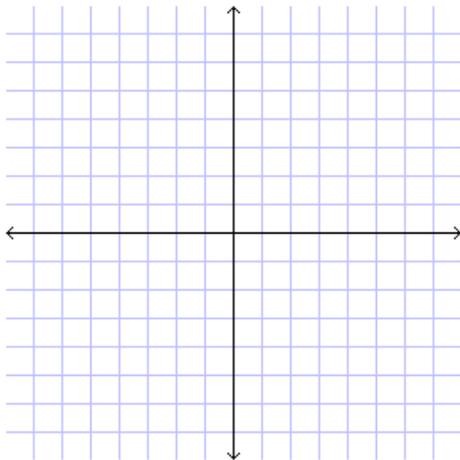
c.  $q(x) = \frac{x^2-4}{x+1}$

d.  $p(x) = \frac{x^2+2x+1}{x^2+5}$

3. Graph each of the following rational functions, labeling all asymptotes and intercepts:

a.  $f(x) = \frac{3x}{x^2-16}$

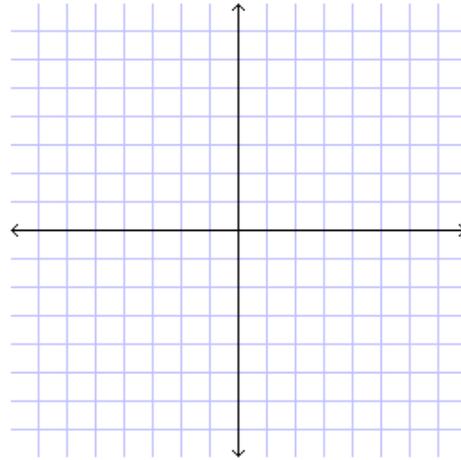
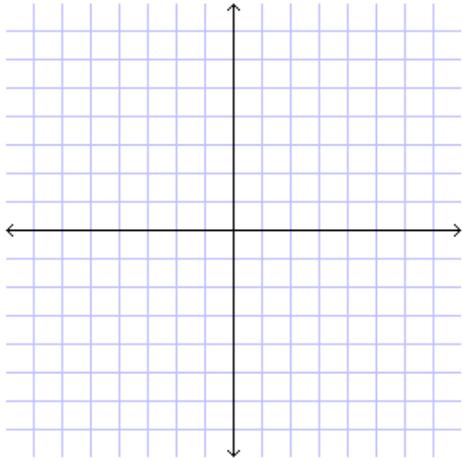
b.  $g(x) = \frac{x+1}{2x-5}$



4. Graph each of the following rational functions, labeling all asymptotes and intercepts:

a.  $q(x) = \frac{x^2-4}{x+1}$

b.  $p(x) = \frac{x^2+2x+1}{x^2+5}$



5. Solve the following rational inequalities:

a.  $\frac{3x}{x^2-16} \leq 0$

b.  $\frac{x+1}{2x-5} > 0$

c.  $\frac{x}{x-4} \geq \frac{2x}{x+1}$