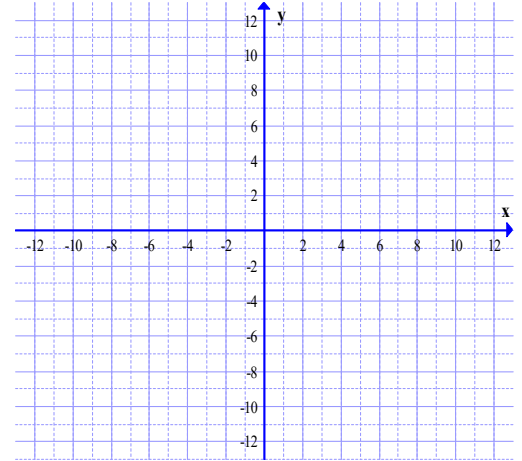


## 5.4 Practice Problems

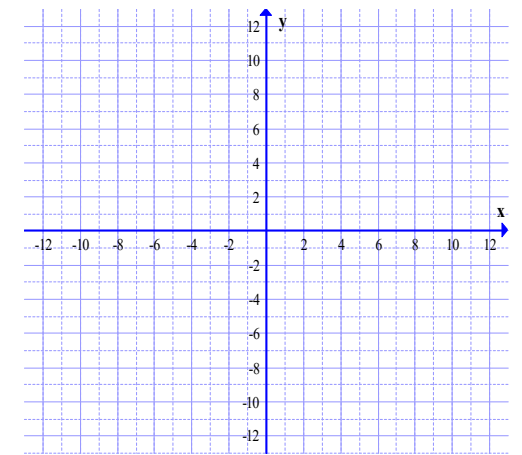
1. Graph the base function. Identify the location of any vertical or horizontal asymptotes.

$$f(x) = \frac{1}{x}$$



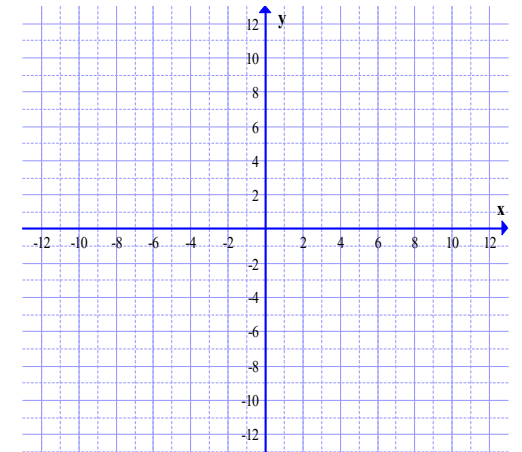
2. Graph the rational function using transformations.

$$f(x) = -\frac{1}{x-2} + 5$$



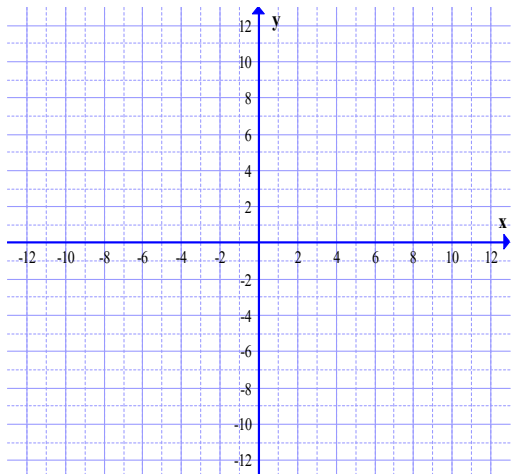
3. Graph the base function. Identify the location of any vertical or horizontal asymptotes.

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



4. Graph the rational function using transformations.

$$f(x) = -\frac{1}{(x-2)^2} + 5$$



5. Use the graph to find the following.

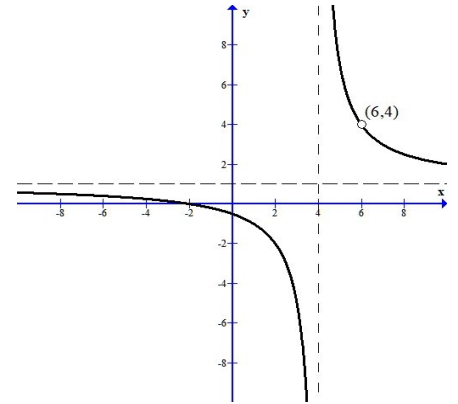
Domain: \_\_\_\_\_ Range: \_\_\_\_\_

x-intercepts: \_\_\_\_\_ y-intercept: \_\_\_\_\_

Horizontal or Oblique/Slant Asymptote: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Holes/Removable Discontinuities: \_\_\_\_\_



6. Use the graph to find the following.

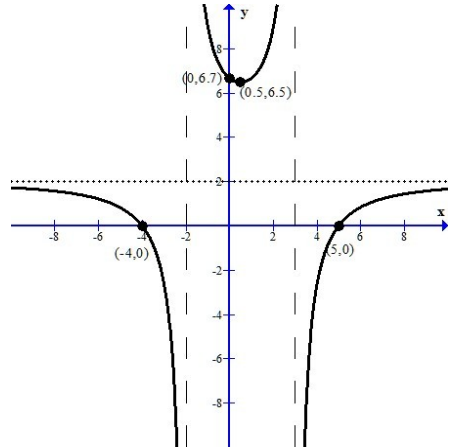
Domain: \_\_\_\_\_ Range: \_\_\_\_\_

x-intercepts: \_\_\_\_\_ y-intercept: \_\_\_\_\_

Horizontal or Oblique/Slant Asymptote: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Holes/Removable Discontinuities: \_\_\_\_\_



7. Use the graph to find the following.

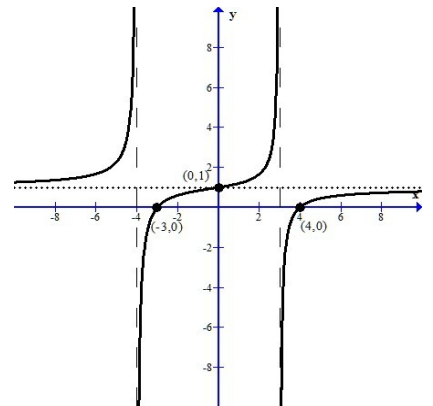
Domain: \_\_\_\_\_ Range: \_\_\_\_\_

x-intercepts: \_\_\_\_\_ y-intercept: \_\_\_\_\_

Horizontal or Oblique/Slant Asymptote: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Holes/Removable Discontinuities: \_\_\_\_\_



8. Use the graph to find the following.

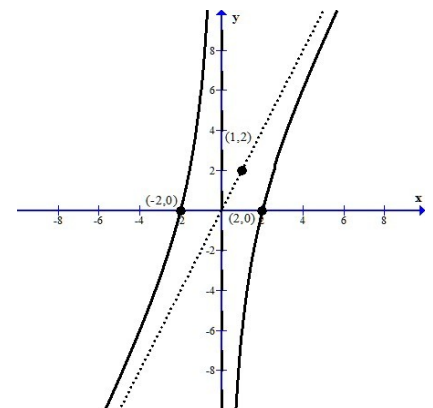
Domain: \_\_\_\_\_ Range: \_\_\_\_\_

x-intercepts: \_\_\_\_\_ y-intercept: \_\_\_\_\_

Horizontal or Oblique/Slant Asymptote: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Holes/Removable Discontinuities: \_\_\_\_\_



9. Find the domain of the following rational functions.

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

b.  $g(x) = \frac{x+1}{2x-6}$

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

d.  $R(x) = \frac{x^2-9}{x^2+x-2}$

e.  $G(x) = \frac{x^2+2x-15}{x^2-25}$

f.  $G(x) = \frac{x^4-16}{x^2+9}$

10. Find the vertical asymptotes of the function, if any.

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

b.  $g(x) = \frac{x+1}{2x-6}$

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

d.  $R(x) = \frac{x^2-9}{x^2+x-2}$

e.  $G(x) = \frac{x^2+2x-15}{x^2-25}$

f.  $G(x) = \frac{x^4-16}{x^2+9}$

11. Use your work from above to decide if the function has a hole/removable discontinuity. Identify the location of the holes, if any.

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

b.  $g(x) = \frac{x+1}{2x-6}$

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

d.  $R(x) = \frac{x^2-9}{x^2+x-2}$

e.  $G(x) = \frac{x^2+2x-15}{x^2-25}$

f.  $G(x) = \frac{x^4-16}{x^2+9}$

12. Find the horizontal asymptote or oblique asymptote of the functions, if any.

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

b.  $g(x) = \frac{x+1}{2x-6}$

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

d.  $R(x) = \frac{x^2-9}{x^2+x-2}$

e.  $G(x) = \frac{x^2+2x-15}{x^2-25}$

f.  $G(x) = \frac{x^4-16}{x^2+9}$

13. Find any points for which the graph crosses the horizontal or oblique asymptote.

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

b.  $g(x) = \frac{x+1}{2x-6}$

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

d.  $R(x) = \frac{x^2-9}{x^2+x-2}$

e.  $G(x) = \frac{x^2+2x-15}{x^2-25}$

f.  $G(x) = \frac{x^4-16}{x^2+9}$

14. Find the intercepts of the rational functions.

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

b.  $g(x) = \frac{x+1}{2x-6}$

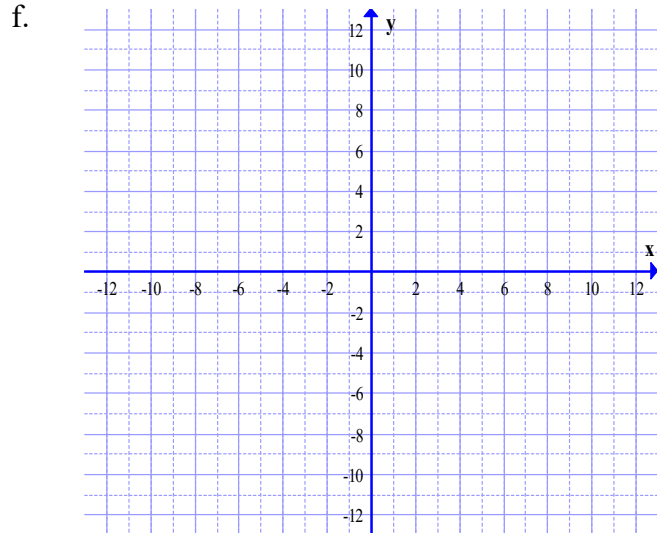
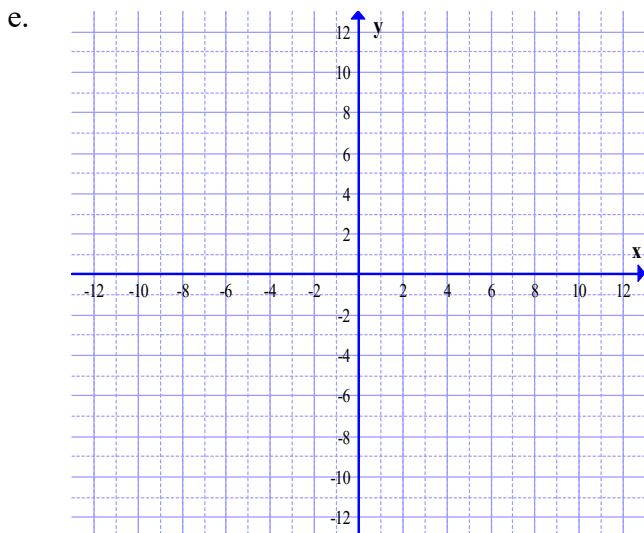
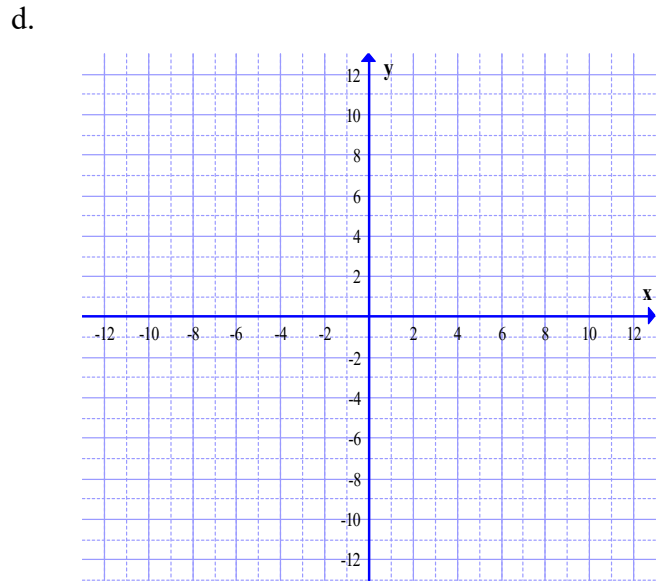
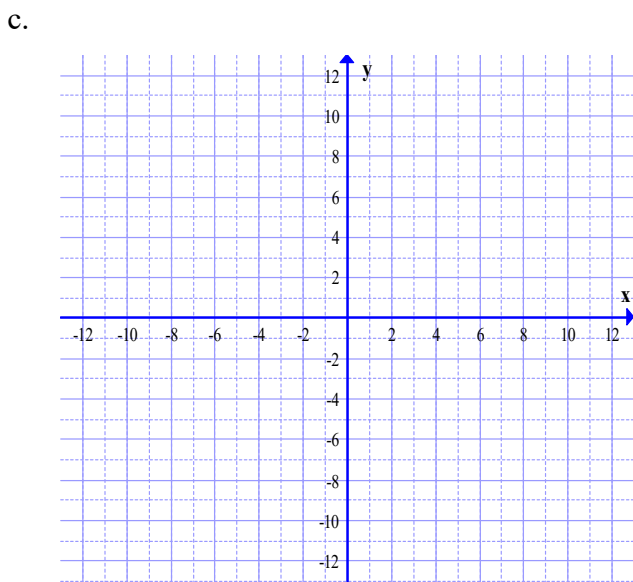
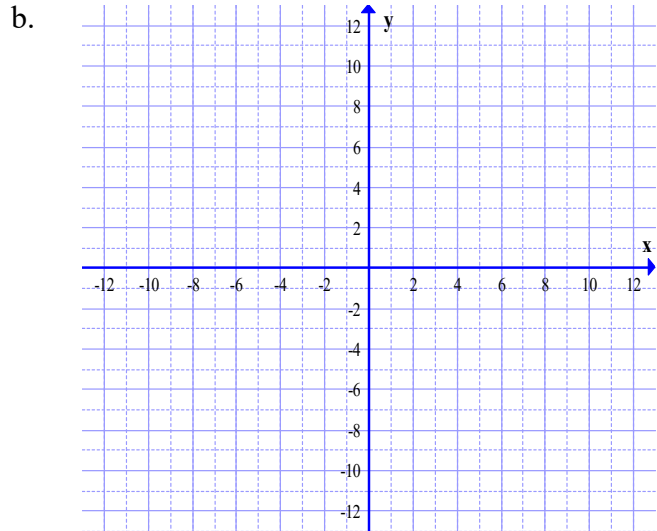
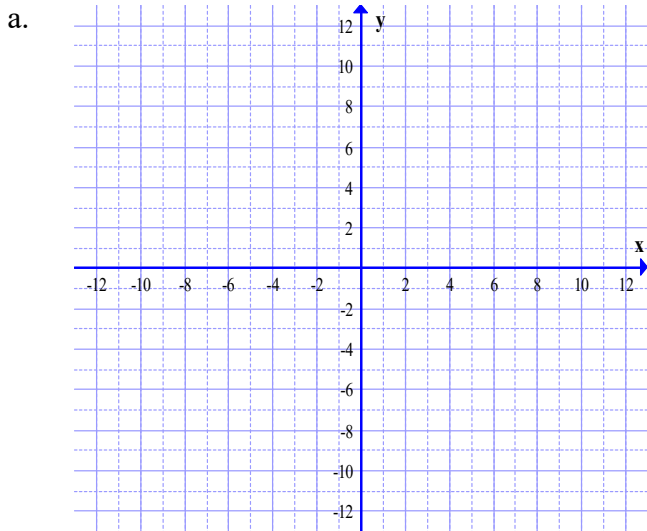
c.  $h(x) = \frac{3x^2-6x+2}{x-2}$

d.  $R(x) = \frac{x^2-9}{x^2+x-2}$

e.  $G(x) = \frac{x^2+2x-15}{x^2-25}$

f.  $G(x) = \frac{x^4-16}{x^2+9}$

15. Use the information in 9-14 to graph a-f.



Use the function  $f(x) = \frac{2x}{x^2 - 9}$  to answer the following questions.

16. Find the domain of the function.

17. Find any vertical asymptotes or holes in the graph.

18. Find any horizontal or oblique asymptotes and any points where the function crosses these asymptotes.

19. Find any x or y intercepts.

20. Use the information to graph the function.

