

1. Which of the following functions are classified as “rational?”

a. $n(x) = \frac{7x^2 + 6\sqrt{x} - 6}{3 - 7x^7}$

d. $r(x) = \frac{7x^2 + 6x - 6}{3 - 7x^{-7}}$

g. $b(x) = \frac{7x^2 + 6x - 6}{3}$

b. $t(x) = \frac{3 - 7x^3}{7x^{0.7} + 6x - 6}$

e. $c(x) = \frac{7x^2 + 6x - 6}{3 + |x|}$

h. $s(x) = \frac{\sqrt{7}x^2 + 6x - 6}{3 - 7x^7}$

c. $m(x) = \frac{7x + 6}{7x + 6}$

f. $h(x) = \frac{3}{7x^2 + 6x - 6}$

i. $a(x) = \frac{7x^2 + 6x - 6}{3 - 7x^7}$

2. Determine the domains of the following rational functions.

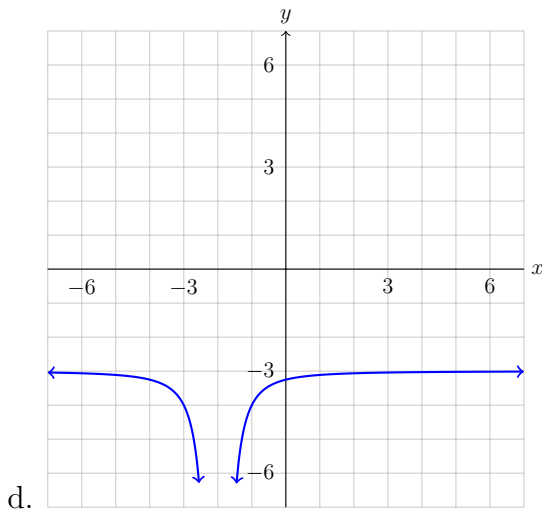
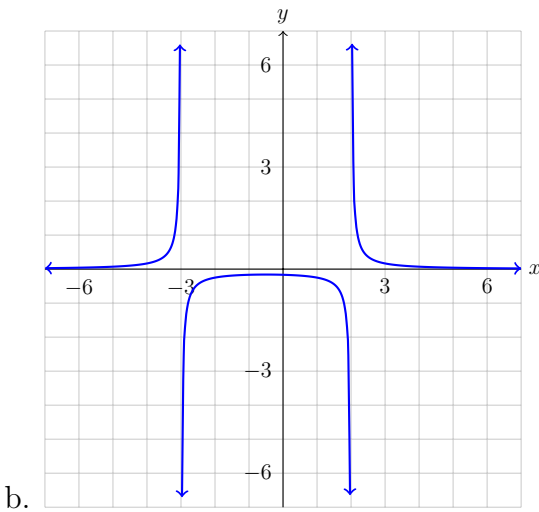
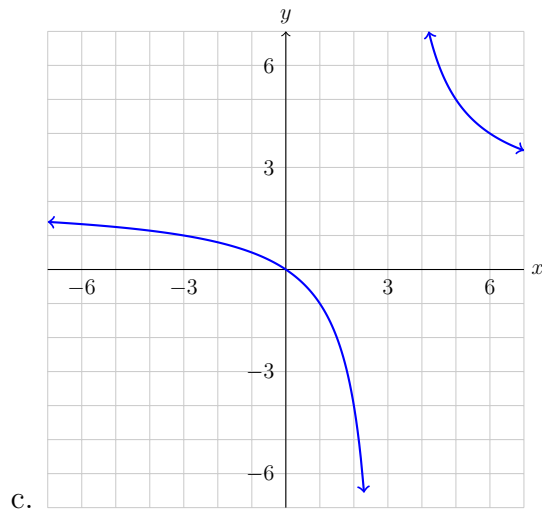
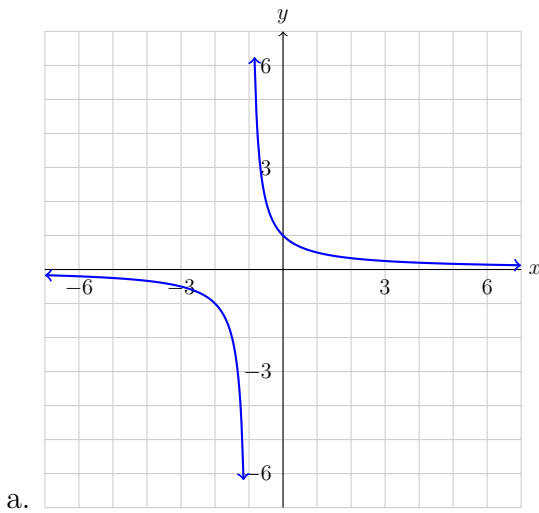
a. $K(x) = \frac{5x}{x - 10}$

c. $F(x) = \frac{2x - 7}{x^2 + 2x}$

b. $g(x) = -\frac{4x + 3}{x^2 - 3x - 40}$

d. $p(x) = \frac{x - 8}{x^2 + 16}$

3. Determine the domain and range of the following rational function's graphs. What are the asymptotes of each?



4. The concentration of a drug in a patient's blood stream, in milligrams per liter, can be modeled by the function $C(t) = \frac{9t}{t^2 + 6}$ where t is the number of hours since the drug is injected. Graph the function using GeoGebra. After how many hours will the drug's concentration be a maximum and what is this maximum? What is the concentration going to as time goes on?

5. Multiply and divide as appropriate.

a. $-\frac{9}{11} \cdot \frac{13}{24}$

b. $-\frac{10}{9} \cdot \left(-\frac{19}{4}\right)$

c. $\frac{3}{8} \div \frac{8}{3}$

d. $\frac{4}{25} \div \left(-\frac{3}{10}\right)$

6. Simplify the following rational expressions, and if applicable, write the restricted domain on the simplified expression.

a. $\frac{t+7}{(t-10)(t+7)}$

d. $\frac{5r^2+8r+3}{-r+5-6r^2}$

b. $\frac{(y-3)(y-9)}{9-y}$

e. $h(x) = \frac{x-5}{x^2+x-30}$

c. $\frac{t-t^2}{t^2-6t+5}$

f. $g(r) = \frac{5r^3+3r^2}{5r^3-22r^2-15r}$

$$\text{g. } \frac{y^2 + 7y + 12}{y - 6} \cdot \frac{5y - 30}{y + 4}$$

$$\text{k. } \frac{x^4}{x^2 + 6x} \div \frac{1}{x^2 + x - 30}$$

$$\text{h. } \frac{5x^2 - x - 4}{126x^2 - 105x} \cdot \frac{15x - 18x^2}{25x^2 - 16}$$

$$\text{l. } \frac{\frac{r}{(r-3)^2}}{\frac{9r}{r^2-9}}$$

$$\text{i. } \frac{y}{y + 10} \div 5y^2$$

$$\text{m. } \frac{5yx}{3y} \cdot \frac{3y^2x^3}{25x^5}$$

$$\text{j. } (2r - 6) \div (4r - 12)$$

$$\text{n. } \frac{\frac{xy^2}{7z}}{\frac{x}{10yz}}$$