

1. Determine whether the following sets of inputs and outputs constitute a function. Explain why or why not. What is the domain and range of each?

a.  $\{(1, 2), (3, 4), (3, 5), (-2, 1)\}$

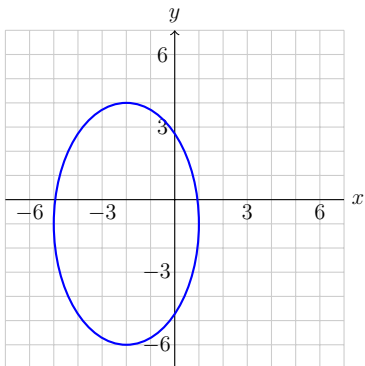
c.  $\{(1, 1), (2, 2), (3, 3), (4, 5)\}$

b.  $\{(-2, 5), (3, 6), (6, 3), (5, 2)\}$

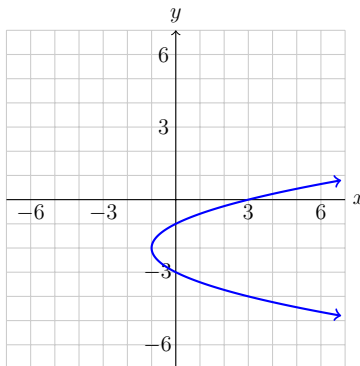
d.  $\{(-5, -5), (-5, -5), (-6, 5), (-8, 5)\}$

2. Which of these graphs constitute a function? Determine the domain and range of each.

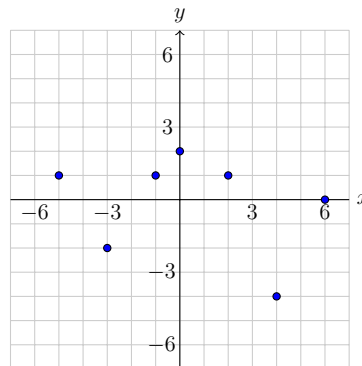
a.



b.



c.



3. Which of the following equations constitute  $y$  being a function of  $x$ ?

a.  $y^6 + x = 1$

c.  $|y| - x = 0$

e.  $4x + 2y + 4 = 0$

b.  $y - |x| = 0$

d.  $y + x^2 + 1$

f.  $y^2 + x^2 + 1 = 2$

4. Determine the domains of the following rational functions.

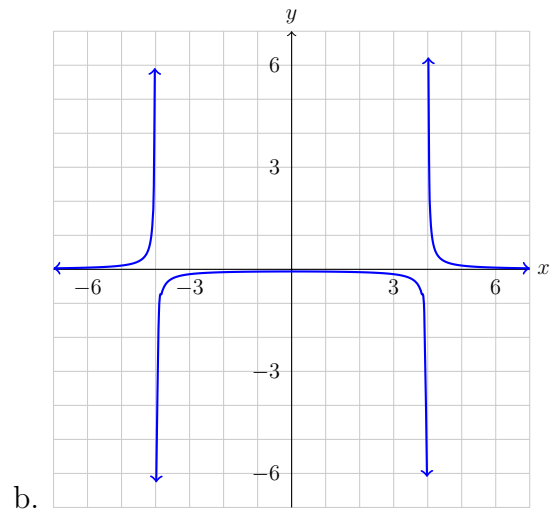
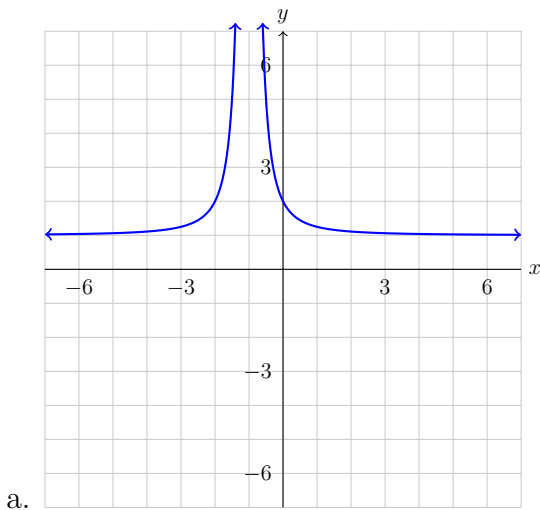
a.  $f(x) = \frac{-2x}{5x + 7}$

c.  $h(x) = \frac{5x + 1}{2x^2 - 4x}$

b.  $g(x) = -\frac{x - 5}{4x^2 - 4x - 3}$

d.  $k(x) = \frac{8 - x}{x^2 + 5}$

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



6. In a forest, the number of deer can be modeled by the function  $f(t) = \frac{240t + 240}{0.6t + 4}$ , where  $t$  stands for the number of years from now. Graph the function in GeoGebra. When will there be approximately 230 deer living in the forest? How many deer is the population tending towards as time goes on?

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

a.  $G(y) = \frac{y^3 - 9y}{y^3 + 13y^2 + 30y}$

e.  $\frac{4t^2 - 49}{2t^2 + 11t + 14} \div (7 - 2t)$

b.  $K(r) = \frac{r^4 - 8r^3 + 4y^2}{3y^4 + 5y^3 - 2y^2}$

f.  $\frac{15r^3t^4}{r + 9t} \div \frac{3r^8t}{r^2 - 81t^2}$

c.  $\frac{r^2 - 9r}{r^2 - 9} \cdot \frac{r^2 - 3r}{r^2 - 7r - 18}$

g.  $\frac{\frac{10a+10}{a}}{\frac{a+7}{a}}$

d.  $\frac{6t - 24}{28 - 21t - 7t^2} \cdot \frac{t^2 - 2t + 1}{2t^2 - 8t}$

h.  $\frac{\frac{mn^2}{5k^2}}{\frac{10m^2}{n^3k}}$