

Analyzing Rational Functions

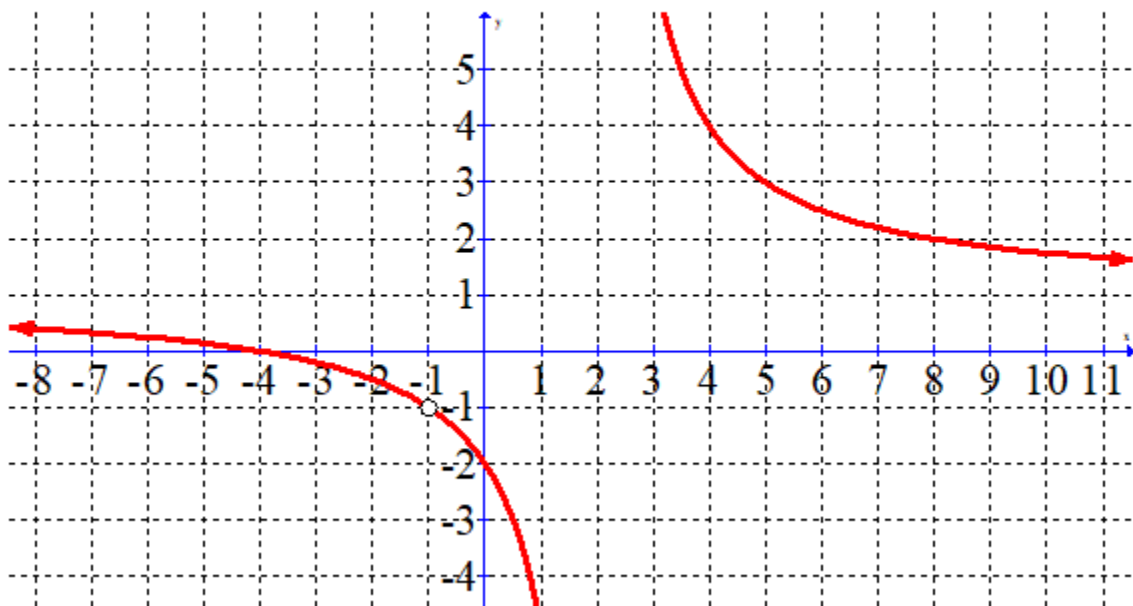
Use the information below to answer the first question.

$$f(x) = \frac{x+2}{x^2-3x-10} \text{ is a rational function.}$$

1. Which statement below is true?
 - a) The domain is $x \neq -5$.
 - b) The range is $y > 0$.
 - c) The point of discontinuity is $\left(-2, \frac{1}{7}\right)$.
 - d) The horizontal asymptote is $y = 0$.

Use the information below to answer the next question.

The equation of the vertical asymptote of the graph below is $x = 2$ and a point of discontinuity is at $(-1, -1)$



2. Which equation best describes the graph?

a) $y = \frac{(x+4)(x+1)}{(x-2)(x+1)}$

b) $y = \frac{(x+4)}{(x-2)}$

c) $y = \frac{(x+4)}{(x+2)(x+1)}$

d) $y = \frac{(x+4)(x+3)}{(x-2)(x+3)}$

3. The rational function, $f(x) = \frac{(4x+1)(x-k)}{(x-5)(x-k)}$ has a point of discontinuity at

a) $\left(-k, \frac{4k+1}{k-5}\right)$

b) $\left(k, \frac{4k+1}{k-5}\right)$

c) $\left(-x, \frac{4k+1}{k-5}\right)$

d) $\left(x, \frac{k-5}{4k+1}\right)$

Use the following information to answer the next question.

Consider two graphs:

$$f(x) = \frac{x^2 - 2x - 3}{x + 3} \text{ and } g(x) = \frac{x^2 + 2x - 3}{x + 3}$$

4. The graph having a vertical asymptote is _____ and the graph having a point of discontinuity is _____. Each has a non-permissible value of $x \neq$ _____

Use the following information to answer the next question.

Given the function $f(x) = \frac{(4x-3)(5x+1)}{(-x+2)(4x-3)}$, the possible equations for the vertical and horizontal asymptotes are listed in the chart below.

| | Vertical Asymptote | Horizontal Asymptote |
|---|--------------------|----------------------|
| A | $x = \frac{3}{4}$ | $y = -5$ |
| B | $x = \frac{3}{4}$ | $y = 4$ |
| C | $x = 2$ | $y = -5$ |
| D | $x = 2$ | $y = 4$ |

5. The row that accurately states each asymptote is row _____.

6. The rational equation $f(x) = \frac{ax}{x^2 - k}$ has a domain of $x \neq \pm 6$. If $f(3) = -1$, then the value of k is _____ and the value of a is _____.

7. What is the equation of the rational function below?

