

Name \_\_\_\_\_

Date \_\_\_\_\_

Graph the rational and find all the characteristics. Slant:  $\frac{1}{1} \frac{-1}{0} \frac{2}{0}$

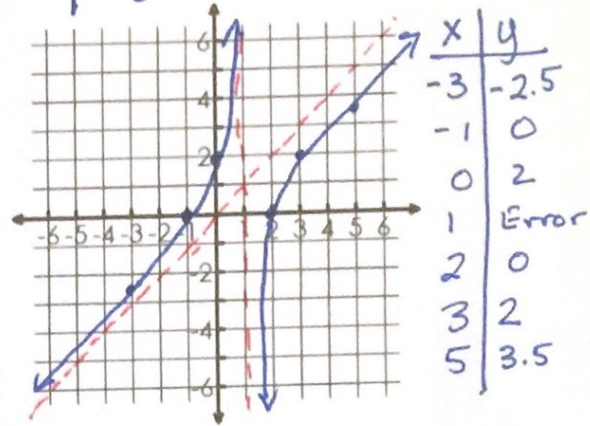
$$1. f(x) = \frac{x^2 - x - 2}{x - 1} = \frac{(x - 2)(x + 1)}{x - 1}$$

VA:  $x = 1$  HA: None slant:  $y = x$

x-int:  $(-1, 0)(2, 0)$  y-int:  $(0, 2)$  holes: None

Domain:  $\mathbb{R}, x \neq 1$  Range:  $\mathbb{R}$

inc:  $(-\infty, 1) \cup (1, \infty)$  dec: N/A



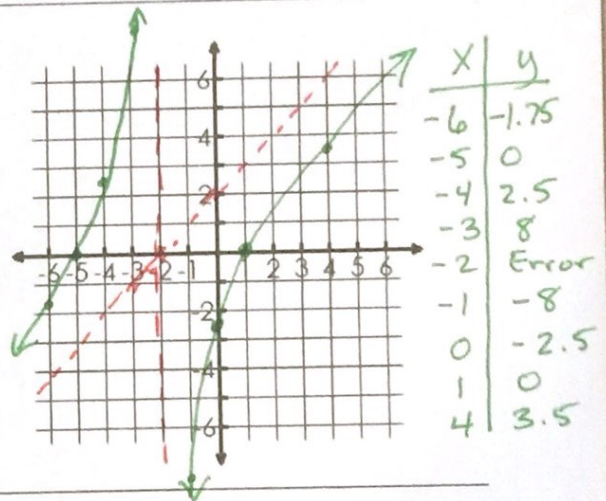
$$2. f(x) = \frac{x^2 + 4x - 5}{x + 2} = \frac{(x + 5)(x - 1)}{x + 2}$$

VA:  $x = -2$  HA: None slant:  $y = x + 2$

x-int:  $(-5, 0)(1, 0)$  y-int:  $(0, -2.5)$  holes: None

Domain:  $\mathbb{R}, x \neq -2$  Range:  $\mathbb{R}$

inc:  $(-\infty, -2) \cup (-2, \infty)$  dec: N/A



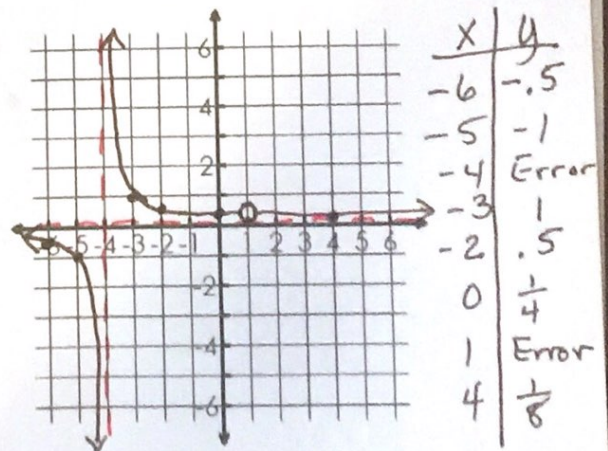
$$3. f(x) = \frac{x - 1}{x^2 + 3x - 4} = \frac{x - 1}{(x + 4)(x - 1)} = \frac{1}{x + 4}$$

VA:  $x = -4$  HA:  $y = 0$  slant: N/A

x-int: None y-int:  $(0, \frac{1}{4})$  holes:  $(1, \frac{1}{5})$

Domain:  $\mathbb{R}, x \neq -4, 1$  Range:  $\mathbb{R}, y \neq 0, \frac{1}{5}$

inc: N/A dec:  $(-\infty, -4) \cup (-4, 1) \cup (1, \infty)$



4. Determine all asymptotes & holes for

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

$$VA: x = 2$$

$$HA: \text{None}$$

$$\text{Holes: None}$$

5. Determine all asymptotes & holes for

$$f(x) = \frac{6 - 2x}{3 - x} = \frac{-2x + 6}{-x + 3} = \frac{-2(x - 3)}{-1(x - 3)}$$

$$VA: x = 3$$

$$HA: y = 2$$

$$\text{Holes: } (3, 2)$$

6. Write a rational equation with vertical asymptotes of
- $x = 1$
- ,
- $x = \frac{-1}{3}$
- and horizontal asymptote of
- $y = 5$
- .

$$f(x) = \frac{5x^2}{(x - 1)(3x + 1)} = \frac{5x^2}{x^2 - 2x - 1}$$

7. Write a rational equation with vertical asymptote of
- $x = 4$
- , a horizontal asymptote of
- $y = 3$
- and a zero at
- $x = -2$
- .

$$f(x) = \frac{3(x + 2)}{x - 4} = \frac{3x + 6}{x - 4}$$

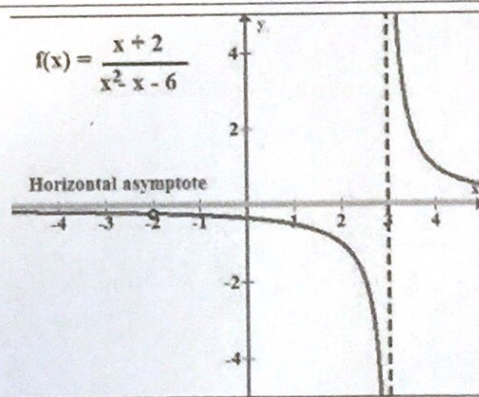
8. Find all information for the graph.

$$VA: x = 3 \quad HA: y = 0 \quad \text{slant: N/A}$$

$$x\text{-int: None} \quad y\text{-int: } (0, -\frac{1}{3}) \quad \text{holes: } (-2, -\frac{1}{5})$$

$$\text{Domain: } \mathbb{R}, x \neq 3 \quad \text{Range: } \mathbb{R}, y \neq 0, -\frac{1}{5}$$

$$\text{inc: } \quad \text{dec: } (-\infty, 3) \cup (3, \infty)$$



$$\text{Holes: } \frac{x+2}{(x-3)(x+2)}$$

$$x = -2$$

$$y = \frac{1}{-2-3} = -\frac{1}{5}$$