

Name _____

Date _____

Graph the rational and find all the characteristics.

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

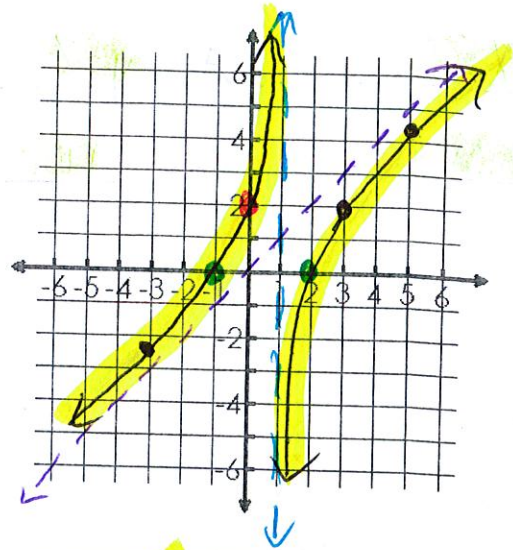
$$\begin{array}{r} 1 \ 1 \ -1 \ -2 \\ \underline{1 \ 0} \\ 1 \ 1 \ -1 \ -2 \end{array}$$

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

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

Domain: $(-\infty, 1) \cup (1, \infty)$ Range: $(-\infty, \infty)$

inc: $(-\infty, 1) \cup (1, \infty)$ dec: none



x	y
3	-2.5
3	2
5	4.5

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

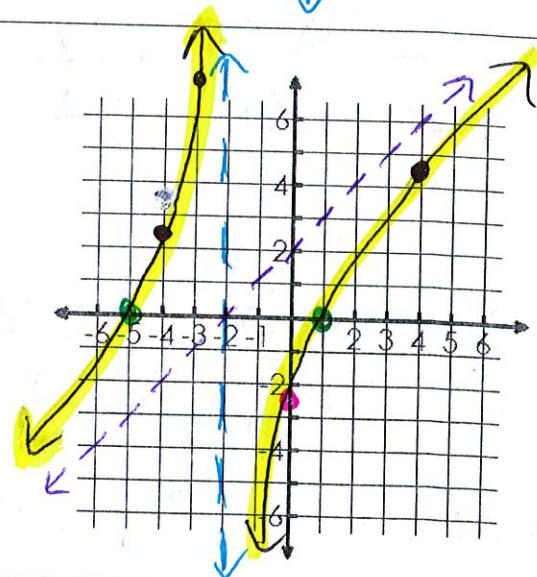
$$\begin{array}{r} -2 \ 1 \ 4 \ -5 \\ \underline{-2 \ -2} \\ 1 \ 2 \end{array}$$

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

x-int: $(-5,0)(1,0)$ y-int: $(0, -\frac{5}{2})$ holes: none

Domain: $(-\infty, -2) \cup (-2, \infty)$ Range: $(-\infty, \infty)$

inc: $(-\infty, -2) \cup (-2, \infty)$ dec: none



x	y
-4	2.5
-3	8
4	4.5

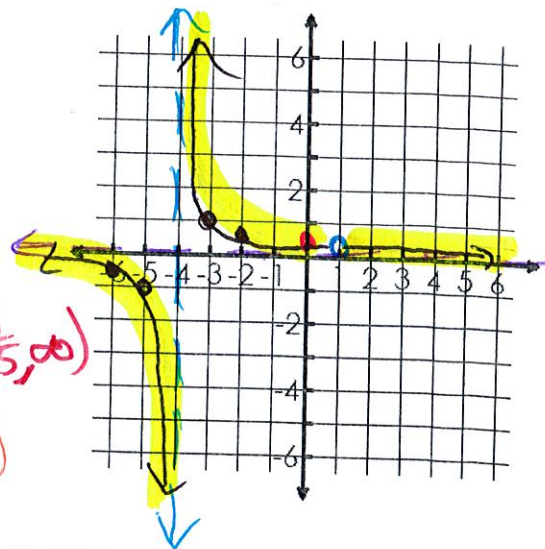
3. $f(x) = \frac{x^2 + 3x - 4}{x^2 + 3x - 4} = \frac{x-1}{x-1(x+4)} = \frac{1}{x+4}$

VA: $x=-4$ HA: $y=0$ slant: none

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

Domain: $(-\infty, -4) \cup (-4, 1) \cup (1, \infty)$ Range: $(-\infty, 0) \cup (0, \frac{1}{5}) \cup (\frac{1}{5}, \infty)$

inc: none dec: $(-\infty, -4) \cup (-4, 1) \cup (1, \infty)$



x	y
-6	-0.5
-5	-1
-3	1
-2	0.5

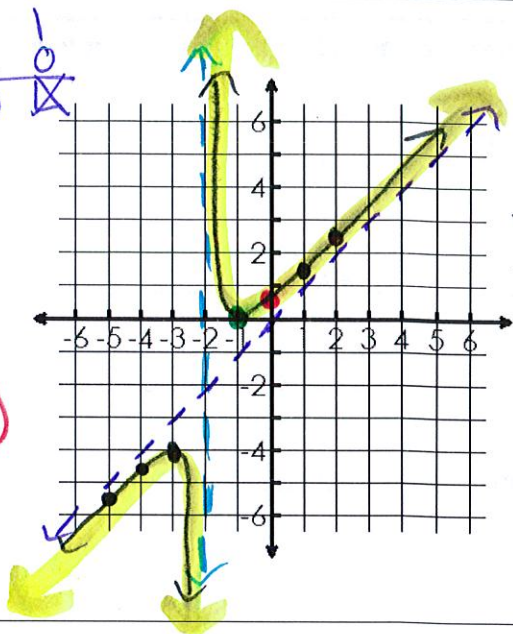
4. $f(x) = \frac{x^2 + 2x + 1}{x + 2} = \frac{(x+1)(x+1)}{x+2}$ $\begin{array}{r} -2 \overline{) 1 \ 2 \ 1} \\ \underline{1 \ 0 \ 1} \\ 0 \ 1 \end{array}$

VA: $x = -2$ HA: none slant: $y = x$

x-int: $(-1, 0)$ *bounce y-int: $(0, \frac{1}{2})$ hole: none

Domain: $(-\infty, -2) \cup (-2, \infty)$ Range: $(-\infty, -4] \cup [0, \infty)$

inc: $(-\infty, -3) \cup (-1, \infty)$ dec: $(-3, -2) \cup (-2, -1)$



x	y
-5	-5.3
-4	-4.5
-3	-4
-1	0
0	1/2
1	1.3
2	2.25

5.

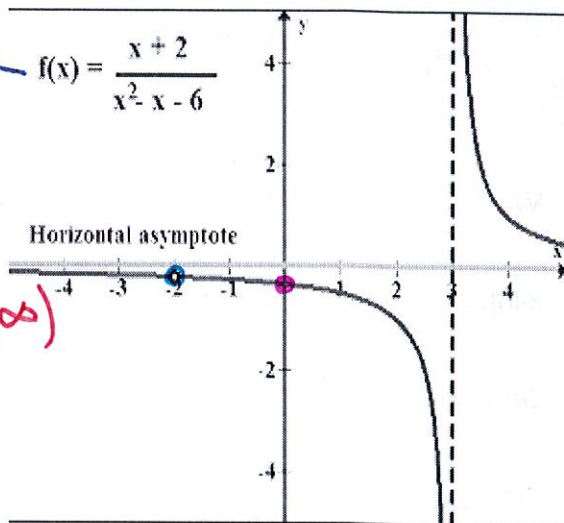
$y = \frac{1}{x-3}$ ← $\frac{x+2}{(x-3)(x+2)}$ ← $f(x) = \frac{x+2}{x^2 - x - 6}$

VA: $x = 3$ HA: $y = 0$ slant: none

x-int: none y-int: $(0, -\frac{1}{3})$ hole: $(-2, -\frac{1}{5})$

Domain: $(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$ Range: $(-\infty, -\frac{1}{5}) \cup (-\frac{1}{3}, 0) \cup (0, \infty)$

inc: none dec: $(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$



6.

VA: $x = -3, 3$ HA: $y = -2$ slant: none

x-int: $(-2, 0) \cup (2, 0)$ y-int: $(0, -1)$ hole: none

Domain: $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$ Range: $(-\infty, -2) \cup [-1, \infty)$

inc: $(0, 3) \cup (3, \infty)$ dec: $(-\infty, -3) \cup (-3, 0)$

