

Integrated Math 3. Chapter 9. Rational Functions. Day 3 Homework Name: _____

For each rational function, determine all of the characteristics listed. **Remember to first simplify the function!**

- A. Identify any discontinuities.
- B. For discontinuities that are vertical asymptotes, write the equation.
- C. For discontinuities that are holes in the graph, name the ordered pair.
- D. Identify the end behavior of the function using limit statements.
- E. If there is a horizontal asymptote, write the equation.
- F. Identify any x-intercepts.
- G. Identify any y-intercepts.
- H. Make a table of values and graph the function on the axes provided.

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

A. $x = -1$

B. no VA

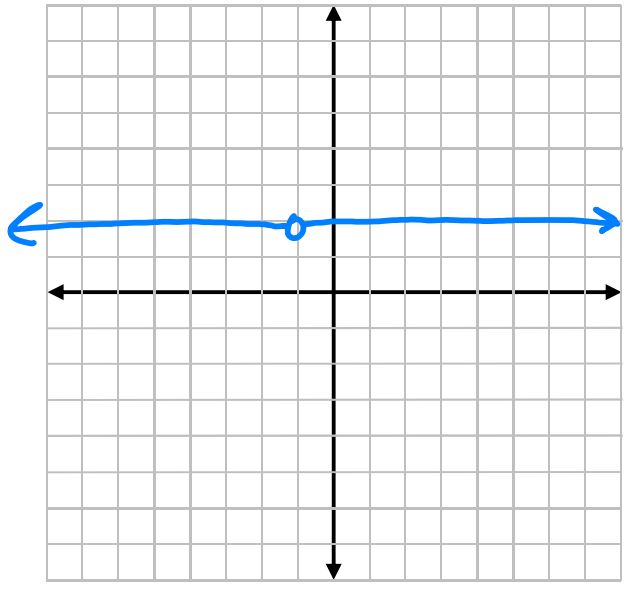
C. $(-1, 2) \rightarrow$ hole in graph

D. $\lim_{x \rightarrow \infty} f(x) = 2$ $\lim_{x \rightarrow -\infty} f(x) = 2$

E. NO H.A.

F. no x-int

G. $(0, 2)$



-4	-3	-2	-1	0	1	2
2	2	2	und	2	2	2

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

A. $x=0, x=4$

B. VA at $x=4$

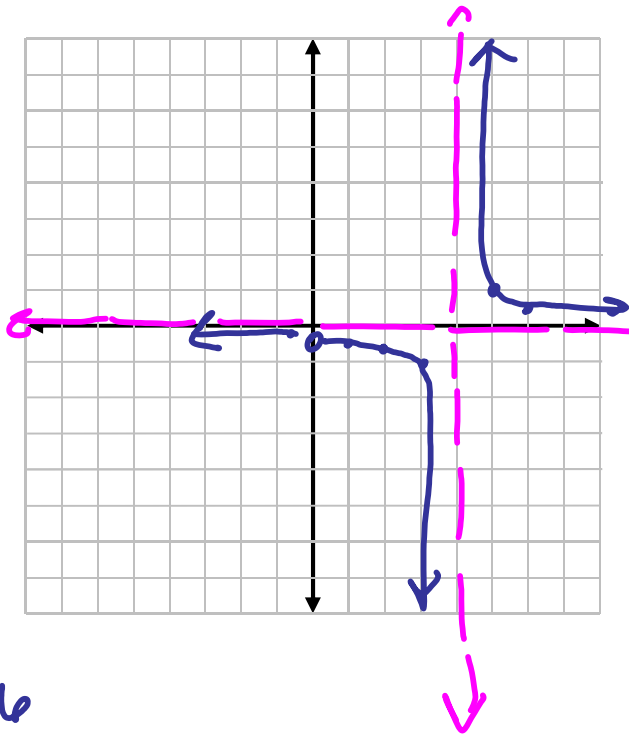
C. hole at $(0, -1/4)$

D. $\lim_{x \rightarrow \infty} f(x) = 0$ $\lim_{x \rightarrow -\infty} f(x) = 0$

E. $y=0$

F. $0 = \frac{1}{x-4} \Rightarrow 0 \neq 1$ no x-intercepts

G. $y = \frac{1}{0-4} = -1/4$ hole at $x=0$ so no y-int.

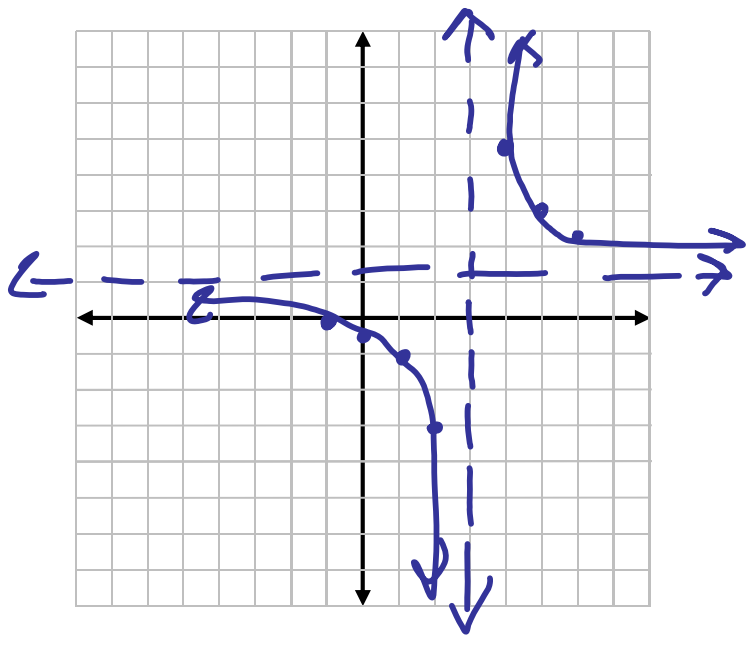


-2	-1	0	1	2	3	4	5	6
-1/6	-1/5	hole	-1/3	-1/2	-1	und	1	1/2

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

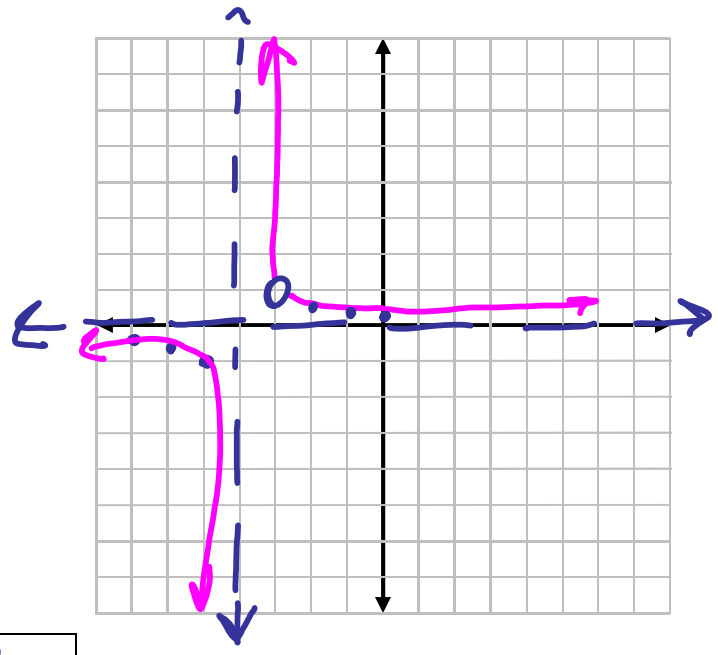
- A. $x=3$
- B. VA. at $x=3$
- C. no hole
- D. $\lim_{x \rightarrow \infty} f(x) = 1$ $\lim_{x \rightarrow -\infty} f(x) = 1$
- E. $y=1$
- F. $0 = \frac{x+1}{x-3}$ $x+1=0$ $x=-1$ $(-1, 0)$
- G. $y = \frac{0+1}{0-3} = -\frac{1}{3}$ $(0, -\frac{1}{3})$



○	1	2	3	4	5	6
$-\frac{1}{3}$	-1	-3	und	5	3	$\frac{7}{3} = 2\frac{1}{3}$

4. $f(x) = \frac{x+3}{x^2+7x+12} = \frac{(x+3)}{(x+3)(x+4)} = \frac{1}{x+4}$

- A. $x=-3$ $x=4$
- B. VA. at $x=-4$
- C. hole at $(-3, 1)$
- D. $\lim_{x \rightarrow \infty} f(x) = 0$ $\lim_{x \rightarrow -\infty} f(x) = 0$
- E. $y=0$
- F. $0 = \frac{1}{x+4}$ $0 \neq 1$ no x-int
- G. $y = \frac{1}{0+4} = \frac{1}{4}$ $(0, \frac{1}{4})$



-7	-6	-5	-4	-3	-2	-1
$-\frac{1}{3}$	$-\frac{1}{2}$	-1	und	hole $(-3, 1)$	$\frac{1}{2}$	$\frac{1}{3}$