

Name _____ Date _____ Per _____

~~Pre-Algebra~~

Rationals Test Review

H. Alg 2

State the domain of the rational function.

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

2. $f(x) = \frac{x+5}{x^2-2x-8}$ $\mathbb{R}, x \neq 4, -2$
 $(x-4)(x+2)$

For the given function, find all asymptotes of the type indicated (if there are any).

3. $f(x) = \frac{(x-4)(x+5)}{x^2-9}$; horizontal $y = 1$
 $(x+3)(x-3)$

4. $f(x) = \frac{x+9}{4x^2-25}$; vertical $x = \pm \frac{5}{2}$
 $(2x+5)(2x-5)$

Solve the equation. Show all work. (Arithmetic to side please.)

5. $\frac{9}{x} + \frac{11}{8} = \frac{31}{x}$
 $45 + 11x = 155$
 $11x = 110$
 $x = 10$

6. $\frac{x}{x-1} = \frac{2x+10}{x+11}$
 $x(x+11) = (2x+10)(x-1)$
 $x^2 + 11x = 2x^2 + 8x - 10$
 $0 = x^2 - 3x - 10$
 $0 = (x-5)(x+2)$
 $x = 5, -2$

$$7. \frac{3x+2}{x+1} = 2 - \frac{(2x+3)(x+1)}{x+1}$$

$$3x+2 = 2x+2 - 2x-3$$

$$3x = -3$$

$$x = -1$$

$$\emptyset$$

$$8. \frac{4x}{x+3} = \frac{37}{x^2-9} - 3 \frac{(x+3)(x-3)}{(x+3)(x-3)}$$

$$4x(x-3) = 37 - 3(x^2-9)$$

$$4x^2 - 12x = 37 - 3x^2 + 27$$

$$7x^2 - 12x - 64 = 0$$

$$(7x + 16)(x - 4) = 0$$

$$x = \frac{-16}{7}, 4$$

Solve each problem. Show all work. Indicate critical points on graph if solving graphically.

9. If the average cost per unit $C(x)$ (in dollars) to produce x units of plywood is given by $C(x) = \frac{1500}{x+50}$, what is the unit cost for 25 units?

$$C(25) = \frac{1500}{25+50} = \frac{1500}{75} = \$20/\text{unit}$$

10. Consider all rectangles with an area of 144 cm^2 . Let x be the length of one side of such rectangle. Express the perimeter as a function of x and determine the minimum perimeter to the nearest cm.

$$xy = 144$$

$$y = \frac{144}{x}$$

$$2x + 2y = P$$

$$2x + 2\left(\frac{144}{x}\right) = P$$

$$P = \frac{288}{x} + 2x$$

$$P = \frac{288 + 2x^2}{x}$$

$$48 \text{ cm}$$

use
calc

Graph the rational functions and complete the characteristics.

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

$y = \frac{1}{x+1}$

Hole
 $(2, \frac{1}{3})$

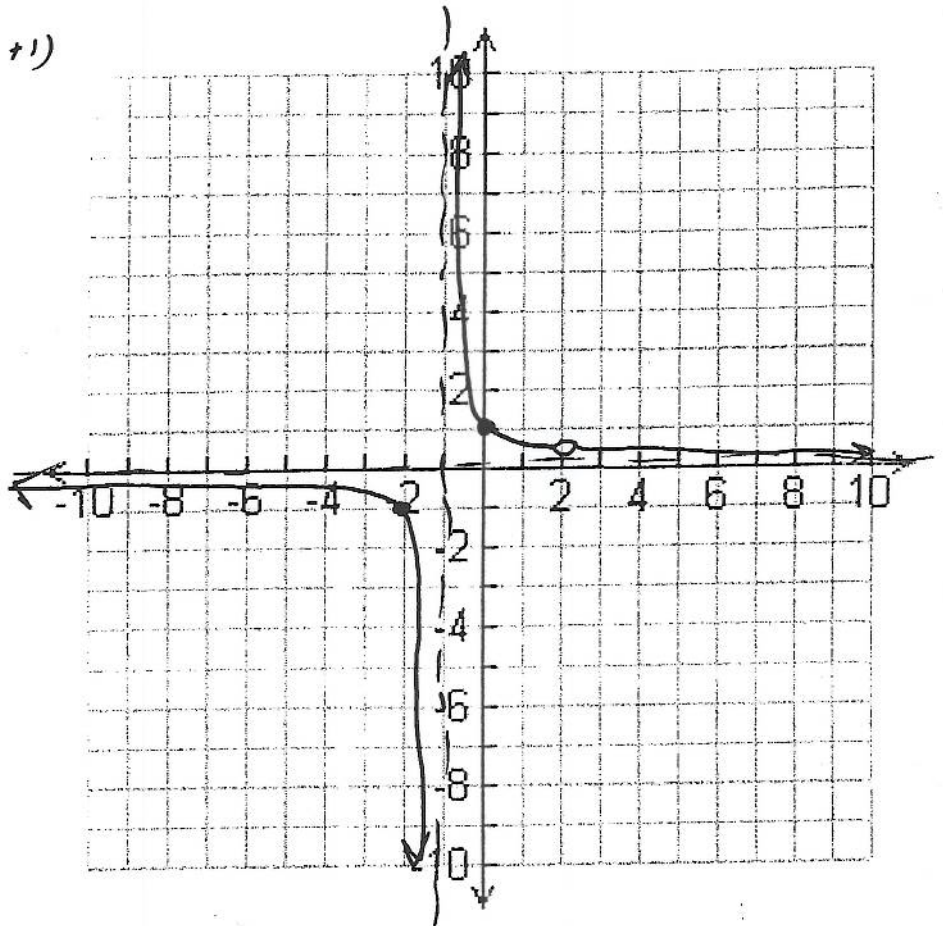
Domain: $\mathbb{R}, x \neq -1, 2$

x-intercept NONE

y-intercept (0, 1)

HA: $y = 0$

VA: $x = -1$



Left End behavior As $x \rightarrow -\infty, f(x) \rightarrow 0$

Right End Behavior As $x \rightarrow \infty, f(x) \rightarrow 0$

Continuous NO

Type of Discontinuity Infinite (point ~~hole~~)

Graph the rational function and complete the characteristics.

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

Domain: $\mathbb{R}, x \neq -2, 1$

x-intercept $(3, 0)$

y-intercept $(0, \frac{3}{2})$

HA: $y = 0$

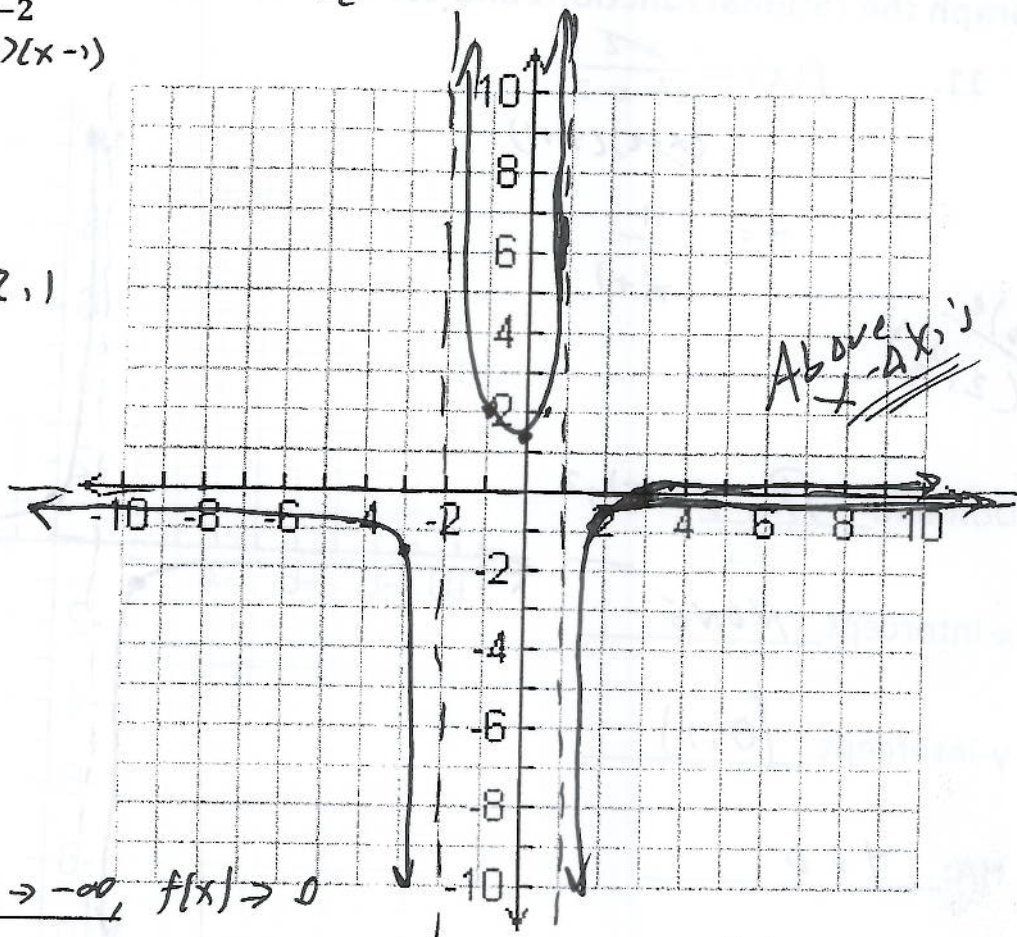
VA: $x = -2, 1$

Left End behavior As $x \rightarrow -\infty, f(x) \rightarrow 0$

Right End Behavior As $x \rightarrow \infty, f(x) \rightarrow 0$

Continuous No

Type of Discontinuity Infinite



x	y	
2	-1/4	-1/4
-3	-2/2	-6/4 = -3/2
-1	2	
0	3/2	
4	1/8	
1/2	-2.5	-4/2 = -2
	-1.25	

$$\frac{1}{8}$$

$$\frac{1}{4} \rightarrow \frac{2}{4} - \frac{8}{4} = -\frac{5}{4}$$