REVIEW: Precalculus 2.4-2.8 NO CALCULATOR Name: Key

Find each of the following pieces of information below. Use it to graph the function.

1.) $f(x)=\frac{x}{x^2-9} = \frac{x}{(x-3)(x+3)}$

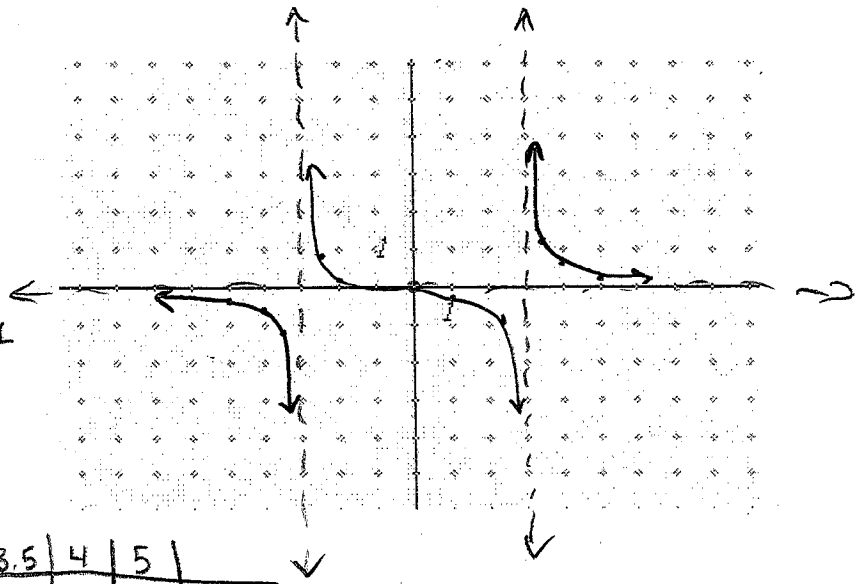
x-intercepts: (0,0)

y-intercepts: (0,0)

V.A: $x=3$ $x=-3$

H.A: $y=0$ $n=1$ $m=2$ Rule 1

Slant Asymptote (if necessary): None



X	-5	-4	-3.5	-2.5	-1	1	2.5	3.5	4	5
Y	-0.3	-0.6	-1.1	0.9	0.1	-.1	-.9	1.1	0.6	0.3

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

x-intercepts: N/A $0=x^2+1$, $-1=x^2$, $\sqrt{-1}=x$

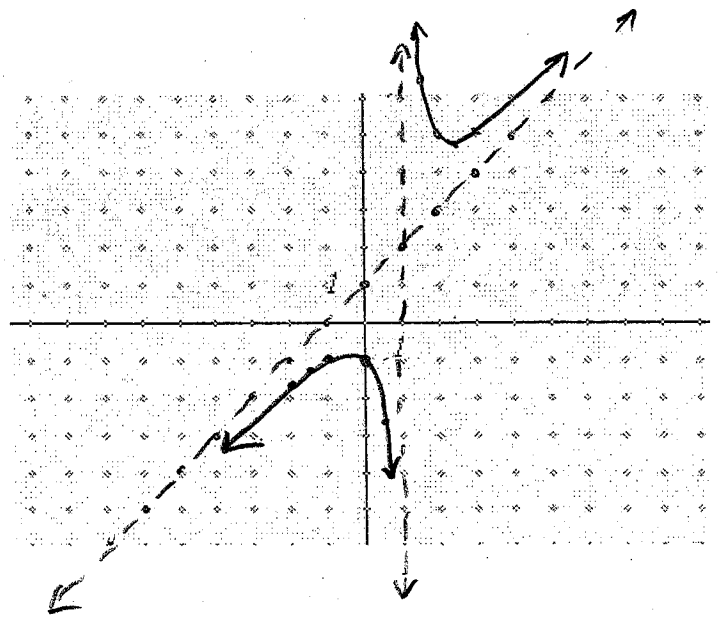
y-intercepts: $\frac{0^2+1}{0-1}=\frac{1}{-1}$ (0,-1)

V.A: $x=1$

H.A: $n=2$ $m=1$ rule 3 No H.A.

Slant Asymptote (if necessary):

1 | 1 0 1
↓ 1 1
1 1 2 → $y=1x+1$



x	y
-2	-1.7
-1.5	-1.3
-1	-1
0.5	-2.5
1.5	6.5
2	5
2.5	4.8
3	5

Use Decartes Rule of Signs to determine the possible number of positive and negative real zeros of the function

3.) $h(t) = +t^3 - 2t^2 - 7t + 2$

2 or 0 positive zeros

$(-t)^3 - 2(-t)^2 - 7(-t) + 2$

$-t^3 - 2t^2 + 7t + 2$

1 Negative Zero

4.) $f(s) = +s^3 - 12s^2 + 40s - 24$

3 or 1 positive zeros

$(-s)^3 - 12(-s)^2 + 40(-s) - 24$

$-s^3 - 12s^2 - 40s - 24$

0 negative zeros

REVIEW: PreCalculus – Calculator Portion Name: _____

Solve each inequality, graph the solution set on a number line.

6.) $x^2 - 7x \le -10$

$x^2 - 7x + 10 \le 0$

$(x-5)(x-2)$

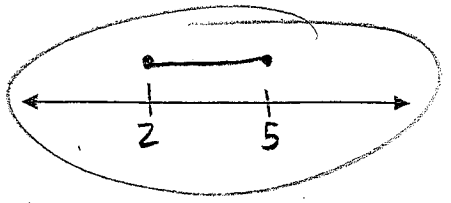
$x=5 \quad x=2$

B.P.

$(-\infty, 2]$ $x=0$ $0^2 - 7(0) + 10 \le 0$ $10 \le 0$ False

$[2, 5]$ $x=3$ $3^2 - 7(3) + 10 \le 0$ $9 - 21 + 10 \le 0$ $-2 \le 0$ True

$[5, \infty)$ $x=6$ $6^2 - 7(6) + 10 \le 0$ $36 - 42 + 10 \le 0$ $4 \le 0$ False



7.) $\dfrac{(x+3)(x-2)}{x+1} \ge 0$

$x=-3$

$x=2$

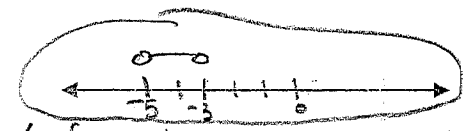
$x=-1$

~~$(-\infty, -3]$~~ $x=-4$ $\dfrac{(-4+3)(-3-2)}{-4+1} \ge 0$ $\dfrac{-1(-5)}{-3} \ge 0$ $-\frac{5}{3} \ge 0$ False

$[-3, -1)$ $x=-2$ $\dfrac{(-2+3)(-2-2)}{-2+1} \ge 0$ $\dfrac{1(-4)}{-1} \ge 0$ $4 \ge 0$ True

~~$(-1, 2]$~~ $x=0$ $\dfrac{(0+3)(0-2)}{0+1} \ge 0$ $\dfrac{3(-2)}{1} \ge 0$ $-6 \ge 0$ False

$[2, \infty)$ $x=3$ $\dfrac{(3+3)(3-2)}{3+1} \ge 0$ $\dfrac{6(1)}{4} \ge 0$ $\frac{6}{4} \ge 0$ True



8.) $\dfrac{x+1}{x+3} > 2$

$-2 \quad -2$

$\dfrac{x+1}{x+3} - \dfrac{2(x+3)}{x+3} > 0$

$\dfrac{x+1-2x-6}{x+3} > 0$

$\dfrac{-x-5}{x+3} > 0$

$x=-5$

$x=-3$

~~$(-\infty, -5)$~~ $x=-6$ $\dfrac{-(-6)-5}{-6+3} > 0$ $\dfrac{6-5}{-3} > 0$ $\frac{1}{-3} > 0$ False

$(-5, -3)$ $x=-4$ $\dfrac{-(-4)-5}{-4+3} > 0$ $\dfrac{4-5}{-1} > 0$ $\frac{-1}{-1} > 0$ $1 > 0$ True

~~$(-3, \infty)$~~ $x=4$ $\dfrac{-(4)-5}{4+3} > 0$ $-\frac{9}{7} > 0$ False

9.) Use synthetic division to show that x is a solution of the function, and use the result to factor the polynomial completely. List all the real zeros of the function:

$48x^3 - 80x^2 + 41x - 6 = 0$; $x = 2/3$

2/3	48	-80	41	-6
	↓	32	-32	6
	48	-48	9	$\boxed{0}$

$48x^2 - 48x + 9$

$3(16x^2 - 16x + 3)$

$3(x^2 - 16x + 48)$

$3\left(x - \frac{12}{16}\right)\left(x - \frac{4}{16}\right)$

$3(x - 3/4)(x - 1/4)$

$\boxed{x = 2/3 \quad x = 3/4 \quad x = 1/4}$

10.) B varies directly as A and inversely as the square of C. B = 7 when A = 9 and C = 6. Find B when A = 4 and C = 8.

$B = \dfrac{KA}{C^2}$ $7 = \dfrac{K(9)}{6^2}$ $36 \cdot 7 = \dfrac{K(9)}{36} \cdot 36$ $\dfrac{252}{9} = \dfrac{K(9)}{9}$ $K = 28$ $B = \dfrac{28A}{C^2}$ $B = \dfrac{28(4)}{8^2}$ $B = \dfrac{112}{64}$ $B = 7/4$

11.) The illumination provided by a car's headlight varies inversely as the square of the distance from the headlight. A car's headlight produces an illumination of 3.75 footcandles at a distance of 40 feet. What is the illumination when the distance is 50 feet?

$I = \dfrac{K}{D^2}$ $3.75 = \dfrac{K}{40^2}$ $1600 \cdot 3.75 = \dfrac{K}{1600} \cdot 1600$ $K = 6000$ $I = \dfrac{6000}{50^2}$ $I = \dfrac{6000}{2500}$

$I = 2.4$ footcandles