HW16: Rational Function Graphs Worksheet Name: key

State the domain of the following rational functions in interval notation.

1) $f(x)=\frac{2x}{3x-1}$ D: $(-\infty,\frac{1}{3})\cup(\frac{1}{3},\infty)$

2) $g(x)=\frac{4}{x^2}$ D: $(-\infty,0)\cup(0,\infty)$

3) $h(x)=\frac{x+2}{x^2+4}$ D: $(-\infty,\infty)$

4) $f(x)=\frac{2x^2}{(x-2)(x+6)}$ D: $(-\infty,-6)\cup(-6,2)\cup(2,\infty)$

5) $g(x)=\frac{3}{x^2(x+5)}$ D: $(-\infty,-5)\cup(-5,0)\cup(0,\infty)$

State the vertical asymptote of the following rational functions, if there is one.

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

7) $g(x)=\frac{8}{x(x+2)}$ $x=0,-2$

8) $h(x)=\frac{x}{x^2-9}$ $x=\pm 3$

9) Write an equation of a rational function that has a numerator of 1 and a vertical asymptote of x=5.

State the horizontal asymptote of the following rational functions, if there is one.

10) $f(x)=\frac{2}{x-1}$ $y=0$

11) $g(x)=\frac{8x}{2x+3}$ $y=4$

12) $h(x)=\frac{x^2}{x-4}$ none

Graphing Rational Functions: $f(x)=\frac{p(x)}{q(x)}$

1. Find the x-intercept, if there is any, by solving p(x)=0.
2. Find the y-intercept, if there is one, by evaluating f(0)
3. Find the vertical asymptote by solving q(x)=0.
4. Find the horizontal asymptote using the rules outlined before.
5. Plot a test point on either side of the vertical asymptote.
6. Connect all points of the graph curving along the asymptotes.

Graph the functions.

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

x-int: none

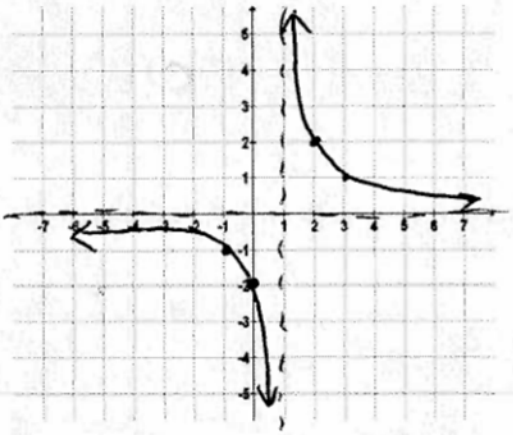
y-int: -2

V.A.: $x=1$

H.A.: $y=0$

Plot Test points

x	y
-1	-1
2	2
3	1



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

Range: $(-\infty,0)\cup(0,\infty)$

14. $f(x)=\frac{x}{x-2}$

x-int: 0

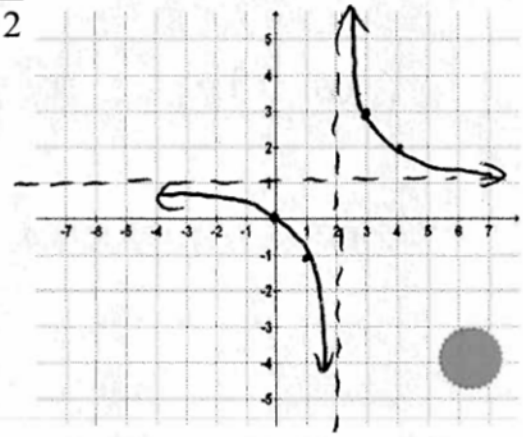
y-int: 0

V.A.: $x=2$

H.A.: $y=1$

Plot Test points

x	y
+1	-1
3	3
4	2



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

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

15. $f(x)=\frac{4}{x+1}$

x-int: none

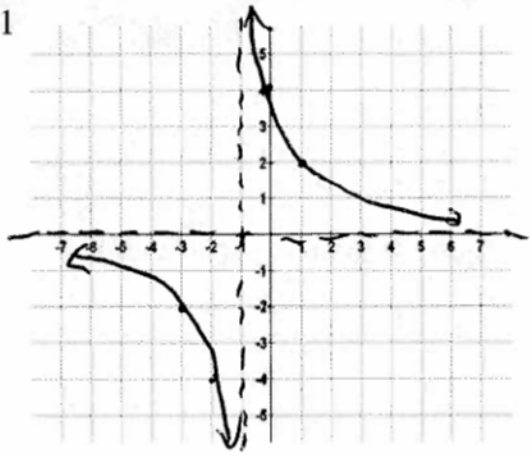
y-int: 4

V.A.: $x=-1$

H.A.: $y=0$

Plot Test points

x	y
-3	-2
-2	-4
1	2



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

Range: $(-\infty,0)\cup(0,\infty)$

16. $f(x)=\frac{2x}{x+3}$

x-int: 0

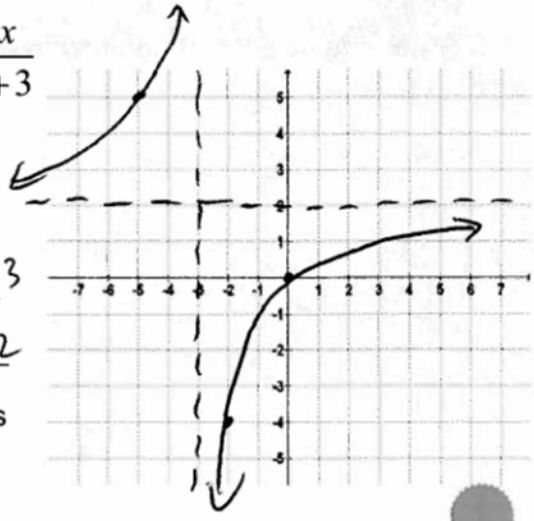
y-int: 0

V.A.: $x=-3$

H.A.: $y=2$

Plot Test points

x	y
-4	8
-5	5
-2	-4



Domain: $(-\infty,-3)\cup(-3,\infty)$

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