Name: _____ Date: _____ **Unit 8 Homework**

Exploring Rational Functions Homework

Directions: Be sure to show all work, communicate your thought process, and justify your reasoning. Remember to check that your answers are complete, correct, and reasonable. Do not forget to complete the "Throwback" problems! ☺

⁉ Simplify each function. Then state the vertical asymptote(s), hole(s), and the domain.

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

2. $f(x)=\dfrac{-8}{x+4}$

3. $g(x)=\dfrac{x^2+5x+6}{2x^2+3x-2}$

4. $h(x)=\dfrac{-x^2-6x}{2x^2-x}$

5. $h(x)=\dfrac{x^4}{3x^2-12}$

6. $g(x)=\dfrac{9}{x}$

7. $p(x)=\dfrac{8x^2-16x-64}{8x+16}$

8. $b(x)=\dfrac{3x^2+2x-8}{x^2-49}$

THROWBACK!

1. Circle all of the logarithms below that evaluate to 1. Check the boxes next to all of the logarithms below that do not evaluate to 1, but have the same value as each other.

☐ $\log_3 3$ ☐ $\log_7 343$ ☐ $\log_3 1$ ☐ $\log_{½}\frac{1}{8}$

☐ $\log_8 8$ ☐ $\log_{27} 3$ ☐ $\log_4 64$ ☐ $\log_{1/4} 2$

2. Consider the functions d(x) = $|x-2|+1$, f(x) = $(x-2)^2+1$, and g(x) = 4x – 7.
Determine the x-value for which d(x) = f(x) = g(x).

3. General admission to a concert is $55, and the reduced price for people who are on a guest list is $20. A total of 721 people attended the concert, and the money brought in from ticket revenue was $33,250. Assuming everyone who attended either paid general admission or used a guest list, determine how many people paid general admission and how many people used the guest list for a reduced price.

Solutions:

	Vertical Asymptote(s)	Hole(s)	Domain
1 $\frac{1}{x-3}$	The line x = 3	when x = -3	$(-\infty,-3)\cup(-3,3)\cup(3,\infty)$
2 $\frac{-8}{x+4}$	The line x = -4	none	$(-\infty,-4)\cup(-4,\infty)$
3 $\frac{x+3}{2x+1}$	The line x = -½	when x = -2	$(-\infty,-2)\cup(-2,-0.5)\cup(-0.5,\infty)$
4 $\frac{-x-6}{2x+1}$	The line x = ½	when x = 0	$(-\infty,0)\cup(0,0.5)\cup(0.5,\infty)$
5 $\frac{x^4}{3x^2-12}$	The lines x = 2 and x = -2	none	$(-\infty,-2)\cup(-2,2)\cup(2,\infty)$
6 $\frac{9}{x}$	The line x = 0	none	$(-\infty,0)\cup(0,\infty)$
7 $x-4$	none	when x = -2	$(-\infty,-2)\cup(-2,\infty)$
8 $\frac{3x-4}{x-7}$	The line x = 7	when x = -7	$(-\infty,-7)\cup(-7,7)\cup(7,\infty)$

Throwback:

1. Circle $\log_3 3$ and $\log_8 8$
Check $\log_7 343$, $\log_{1/2} 1/8$, $\log_4 64$ (all evaluate to 3)

2. x = 2 (graph to see intersecting point of all 3 functions, or notice that the absolute value have the same vertex (2,1), and when x = 2, the value of the y in the line is 1)

3. 538 people did not use the guest list and 183 did use the list
(use and solve a system of equations to obtain this – look back to Algebraic Systems Unit if necessary)