Honors Pre-Calculus Exam 4

I acknowledge that I have read and agree to the Crespi Carmelite High School Academic Integrity Contract (page 24 of the Parent/Student Handbook), and I agree to complete this exam in accordance with the contract's stipulations.

Name and period: _____

Signature: _____

DO NOT BEGIN UNTIL INSTRUCTED TO DO SO

You have until the end of the period to finish this exam. If you happen to finish early please have a seat until the end of the period. The exam is worth **70 points**. You are allowed to write on this exam.

Question:	1	2	3	4	5	6	7	8	Total
Points:	10	10	10	10	10	10	10	10	80
Bonus Points:	0	0	0	0	0	0	0	0	0
Score:									

1. (10 points) Given

$$f(x) = \frac{x+4}{x-4} \text{ and } g(x) = 4^x$$

.

(a) Find $(f \circ g)(x)$ and state the domain.

(b) Find $(g \circ f)(-3)$

2. (10 points) **Evaluate:**

(a) $\log_{\frac{3}{2}}\left(\frac{16}{81}\right) =$

(b) $\log_{\frac{1}{3}}(3^{4x}) =$

(c) $\log_6(-36) =$

(d) $\log(1,000,000,000) =$

3. (10 points) **Write in logarithmic form:**

(a) $10^5 = 100,000$

(b) $5^{-2} = \dfrac{1}{25}$

(c) $\left(\dfrac{1}{4}\right)^{-3} = 64$

(d) $y^{2z} = A$

4. (10 points) Completely expand each logarithm. All exponents should be written as factors. Simplify.

   (a) $\log_3(3x\sqrt[3]{x-2})^4$

   (b) $\ln \dfrac{e^x}{x^3(x^2-7)}$

   (c) $\ln \sqrt[5]{\dfrac{a^3b}{c}}$

5. (10 points) Condense each expression to a single logarithm.

(a) $2\log_3(6) - \frac{3}{2}\log_3(4) + log_3(18)$

(b) $\log_2(5x^2y^3) - \log_2(20x^4y) + \log_2(2xy^6)$

(c) $log\left(\frac{x^2-9}{x^2+2x}\right) - log\left(\frac{x^2+2x-3}{x^2-x-6}\right)$ (Hint: Use log rules and factor each to simplify.)

6. (10 points) Solve each of the following equations.
   (I will pick 2 of these 3 type of problems)
   (a) $2^{x-1} = 3^{x+1}$

   (b) $\log_2(x-4) + \log_2(x+4) = 3$

   (c) $9^x + 4 \cdot 3^x - 3 = 0$ (Equation of Quadratic Type)

7. (10 points) For the graph

$$f(x) = \frac{1}{4^x}, \text{ where } x \in \mathbb{R}$$

(a) Find the domain and range. (**Interval or Set-Builder Notation**)

(b) Graph the function. **Make sure to label at least three points. Make sure any asymptotes are clearly marked and labeled appropriately.**

(c) What is the inverse of this function?

(d) What is the domain and range of the inverse function?

8. (10 points) For the graph $y = \frac{1}{2}\log_3(x+4) + 2$.

(a) Find the domain and range. (**Interval or Set-Builder Notation**)

(b) Describe the transformations necessary to graph the function.

(c) Graph the function. **Make sure to label at least three points. Make sure any asymptotes are clearly marked and labeled appropriately.**

(d) What is the inverse of this function?

(e) What is the domain and range of the inverse function?