Quiz 11 :(**Name:** _____

Total Points possible: 10 out of 10

Math 12: Spring 2025

Instructions: Show all your work in order to receive credit.

Problem 1. (2.25 points) Consider the functions $f(x) = x^3 + 1$ and $g(x) = 2x - 1$. Find $g(f(x))$ and $f(g(x))$ and determine if these two functions are commutative.

Problem 2. (2.25 points) Are $h(x) = x + 2$ and $j(x) = x + 1002$ commutative? Show your claim.

Problem 3. (2.25 points) Simplify the following expression into a single logarithm.

$$\frac{1}{2}\log_3(x^2+1)+\log_3\left(\frac{x+1}{x-1}\right)-\log_3\left(\sqrt{x^2-4}\right)$$

Problem 4. (2.25 points) Expand the following expression completely using logarithmic properties.

$$\log_3\left(\frac{(2x^3\sqrt{y})}{(x+2)^2}\right)$$

Problem 5. (1 point) Don't look this up. I want your opinion. If I remove an arm from a cactus and plant it, is it considered a new cactus or still part of the original?