MATH 1151 – Precalculus Supplemental Lab
Conceptual Activity – Week 4

NAME: _____ **SECTION:** _____

1. Let f be a function such that $f(x) = \dfrac{x^3}{4} + 1$.

   (a) Evaluate the following.

   $f(1) =$ $f(4) =$

   (b) Describe in words the process of the function f. That is, explain step by step what must be done to transform the input x into the output $f(x)$.

   First, take the input x and *do what to it?*

   ⋮

   (c) Without finding a formula for $f^{-1}(x)$, evaluate the following.

   $f^{-1}(3) =$ $f^{-1}\left(\frac{31}{4}\right) =$

   (d) Without finding a formula for $f^{-1}(x)$, describe in words the process of the function f^{-1}. That is, explain step by step what must be done to transform the input x into the output $f^{-1}(x)$.

   (e) Use your answer from (d) to write a formula for $f^{-1}(x)$.

2. What are some things that you know about the concept of inverse functions? Be sure to share with your group.

   Options could include things like domain/range, graphs, algebraic manipulations, etc.

3. Use the idea of inverse functions to find the range of the function g such that

$$g(t) = \frac{2t}{t+3}.$$

4. **Challenge.** Let h be a function such that

$$h(r) = \begin{cases} 2r+1, & r \leq 0 \\ r^3+1, & r > 0 \end{cases}.$$

   Find a formula for $h^{-1}(r)$.