Discussion Problems **Name:** _____

Worksheet 1: Functions

Math 408C:

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Problem 1.

1. Create a function to transform Cartesian coordinates (x, y, z) to Polar coordinates (r, ϕ, θ).
2. Find the inverse of the previous function.

Problem 2. Find the inverse of $f(x) = \frac{4x}{5-x}$. What is the range of $f^{-1}(x)$?

Problem 3. The concentration of carbon-dioxide in a pond has the growth formula $C = A \cdot b^t$. Suppose you measure that the concentration on Day 3 is 0.3 M. 5 days later, you measure that it is 0.9 M. At what time will the concentration in the pond be 1.5 M assuming that our model will still be accurate? What would the inverse of C(t) represent?

Problem 4. Without using a calculator, what would $\sin(2\arccos(x))$ be in terms of x?

Problem 5. Find the domain of $f(x) = \sqrt{x^2 + 2x + 1}$. Find the x-intercepts.

Problem 6. How can we convert degrees, the unit of temperature, in Celsius (T_C) to Fahrenheit (T_F)?

1. Find an expression for T_C in terms of T_F. You are given the following information:
   - $(T_C, T_F) = (0, 32)$ and $(100, 212)$.-
   - The relationship is linear.
2. Find the inverse function of the above function. What does this function represent?