Calculus I, Quiz 1, 1/12/7

Name:

Question 1

Give the domain and range for the following functions and for each decide, giving your reasons, if the function is one-to-one or not:

- $f(t) = t^2 + 4t + 3$
- $g(t) = \frac{1}{t^2 + 4t + 3}$
- $h(t) = \sqrt{t^2 + 4t + 3}$

Question 2

A bacterial culture containing 600 bacteria is delivered at noon on a Monday to a laboratory. After three hours, there are 2400 bacteria in the culture.

- What is the doubling time for the culture?
- How many bacteria are there after $t$ hours?
- When there are 100,000 bacteria, 50,000 are used in an experiment. When will that be?
- The remaining 50,000 are cultured until there are 800,000 bacteria which are then used for a second experiment. When will that be?

Question 3

Let $f(t) = t^2 + 1$ and $g(t) = \sin(t)$. Give formulas for the compositions $f \circ f$, $g \circ g$, $f \circ g$ and $g \circ f$. For each of these functions discuss its domain and range.