

Name:  
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Score: /100

**MATH 305 ODE Quiz 3**  
**Instructor: A. Çağlar**

**Problem 1 (50 pts).** Suppose a student carrying a flu virus returns to an isolated campus of 1000 students. Determine a differential equations for the number of people  $x(t)$  who have contracted the flu if the rate at which the disease spreads is proportional to the number of interactions between the number of students who have the flu and the number of students who have not yet been exposed to it.

**Problem 2 (50 pts).**

Suppose that a cup of coffee cools according to Newton's Law of cooling. If the coffee has temperature of  $160^\circ F$  when freshly poured, and 2 minutes later has cooled to  $100^\circ F$  in a room of  $72^\circ F$ . Determine when the coffee reaches a temperature of  $90^\circ F$ ?