# Math 2300-013: Quiz 11

Name: _____ Score: _____

1. Solve the differential equation

$$\frac{du}{dt} = \frac{3}{ut^2} + \frac{\sec^2(t)}{2u}$$

subject to the initial condition $u(\pi/4) = 1$.

2. Suppose $P(t)$ represents the size of a population in millions $t$ years since 2000 and we know that

   - the birth rate is 0.05 births per person per year;
   - the death rate is 0.02 deaths per person per year;
   - 3 million immigrants join the population each year.

   Write (**but do not solve**) a differential equation for $\frac{dP}{dt}$, the rate of change of the population at time $t$.