

# Quiz 6

Spring 2016

MATH 222-004

Name: \_\_\_\_\_

For full credit please explain all of your answers. **No calculators** are allowed.

**Problem 1.** Solve the following initial value problem. Please show every step for full credit, i.e. do not find the integrating factor and use a memorized equation.

$$\frac{dy}{dx} = -xy + x^3$$

With initial value  $y(0) = 0$

**Problem 2.** Write, but **DO NOT SOLVE** a differential equation that describes the rabbit population at time  $t$  in the following scenario:

Rabbits in Madison have a birth rate of 6% per year and a death rate (from old age) of 2% per year. Each year 1200 rabbits get run over and 700 rabbits move in from Sun Prairie.