Math 333
Quiz 1
Tuesday, January 22, 2008

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1. Consider the population model

$$\frac{dP}{dt} = 0.4P\left(1 - \frac{P}{100}\right)\left(\frac{P}{25} - 1\right),$$

where $P(t)$ is the population at time t.

(a) For what values of P is the population in equilibrium?

(b) For what values of P is the population increasing?

(c) For what values of P is the population decreasing?

2. Find all solutions of the differential equation

$$\frac{dy}{dt} = 2(y^2 - 4)te^{t^2}.$$

3. Solve the initial-value problem

$$\frac{dy}{dx} = \frac{x-y}{x+y}, \quad y(1) = 1.$$