Name:_____Will Buziak_____ At the end of the quiz, scan a pdf of you paper
and turn it in at the back. Then upload your scan to Canvas by 5pm.

Classify the following differential equations as linear or nonlinear (1pt each), and state the order of the ODE (1pt each).

1. $\ddot{x} + 4\dot{x} + 5x = \sin(t)$ 2nd, linear

2. $\dot{x} + 5x^2 = 0$ 1st, nonlinear

3. $\ddot{\theta} + \frac{g}{\ell}\sin\theta = 0$ 2nd, nonlinear

4. Solve the following differential equation, subject to the initial condition. You may use any method, but state your work completely and clearly. (4pts)

$$3\dot{x} + 2x = 0 \qquad x(0) = 5$$

$$3\frac{dx}{dt} + 2x = 0 \qquad x(0) = 5$$

$$3\frac{dx}{dt} + 2(5) = 0$$

$$3\frac{dx}{dt} = -10$$

$$\int 3\,dx = \int -10\,dt$$

$$3x = -10\int dt = -10t + c$$

$$x = -(10/3)t + c$$