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**Math 2150, Fall 2005, Quiz 1**  
**September 7, 2005**

1. Consider the differential equation

$$y' - 5y = 0$$

Let  $y_1(x) = e^{rx}$ . Find the value of  $r$  which makes  $y_1$  a solution of the equation.

2. Consider the differential equation

$$y' - 5y = 4x$$

Find constants  $m$  and  $b$  so that  $y_2(x) = mx + b$  solves the equation.

3. With these values of  $r$ ,  $m$  and  $b$ , show that  $y(x) = Cy_1(x) + y_2(x)$ , i.e.,  $y(x) = Ce^{rx} + mx + b$  solves this differential equation for any constant  $C$ .
4. Again using these values of  $r$ ,  $m$  and  $b$ , solve the differential equation with initial condition  $y(0) = 0$ . That is, find the value of  $C$  which makes both this and the differential equation true.