QUIZ 1 - MATH 310 Monday, January 25

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Read each problem **very carefully** before starting to solve it. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Let $p(t)$ be the population of a certain species at time t. Suppose that at any time t:

   - The population tends to increase at a rate proportional to the population present at time t, with constant of proportionality k;
   - The population tends to decrease at a constant rate d.

   Write a single differential equation based on these assumptions. (Do not solve it!)

2. Find the general solution of the differential equation

$$\frac{dy}{dt} = 3y - 2, \quad y > \frac{2}{3}.$$

   Please, show all steps needed (we must do that, even when not mentioned explicitly, so as to make our work more accessible to the reader).