Part One: *Quick and Easy...*

0. Get to know your classmates... Learn their names; learn where they are from; learn what their interests are; learn whether they wanna be in this class or not.

1. [BDH 1.1.17] The rhinoceros is now extremely rare. Suppose enough game preserve land is set aside so that there is sufficient room for many more rhinoceros territories than there are rhinoceroses. Consequently, there will be no danger of overcrowding. However, if the population is too small, fertile adults have difficulty finding each other when it is time to mate. Write a differential equation that models the rhinoceros population based on these assumptions.

2. [BDH 1.2.28] Find $y = y(t)$ if $\dfrac{dy}{dt} = \dfrac{t}{y - t^2 y}$ with $y(0) = 4$.

3. [BDH 1.3.10] Sketch the slope field for the differential equation $\dfrac{dy}{dt} = (t+1)y$. Also sketch the solution with $y(0) = 1$.

Part Two: *Not Quite Quick and Easy...*

1. [BDH 1.3.14] Suppose we know that the graph to the right is the graph of the right-hand side $f(y)$ of the differential equation $dy/dt = f(y)$. Give a rough sketch of the slope field that corresponds to this differential equation.

How would things change if the instead the graph pictured was of t versus $f(t)$?

2. Returning to $\dfrac{dy}{dt} = (t+1)y$, estimate numerically (without using the slope field) the value of $y(2)$ for the solution with $y(0) = 1$. Is your estimate too small or too large? How can your estimate be improved?

3. Keeping with $\dfrac{dy}{dt} = (t+1)y$, find the (exact) value of $y(2)$ for the solution with $y(0) = 1$. How accurate were your graphical and numerical estimates?