

**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. Sketch (some of) the slope field for the differential equation  $\frac{dy}{dt} = t - y^2$ .

2. [BDH 1.4.2] Estimate, using Euler's Method with  $\Delta t = .25$ , the value of  $y(1)$  if  $\frac{dy}{dt} = t - y^2$  and  $y(0) = 1$ .

**Part Two: A Look Ahead...**

1. Sketch the slope field for the logistic growth model  $\frac{dP}{dt} = kP \left(1 - \frac{P}{N}\right)$ . If  $P(2) = p$ , what is the long term population behavior? Note that your answer to the latter question should be in cases, depending on  $p$ .

2. When determining the long term population behavior of  $P(t)$ , what information from the slope field did you need? What information was superfluous? Does the following *phase line* encapsulate all the necessary information?

3. Draw *phase lines* for the differential equations  $\frac{dP}{dt} = kP$  (if  $k > 0$  and if  $k < 0$ ),  $\frac{dx}{dt} = x^2 - 6x - 7$ , and  $\frac{ds}{dt} = s^2|s - 4|$ .

**Part Three: Your Best Guess...**

1. Estimate as accurately as possible the value of  $y(3)$  if  $\frac{dy}{dt} = 3y + e^{4t}$  and  $y(0) = -1$ .