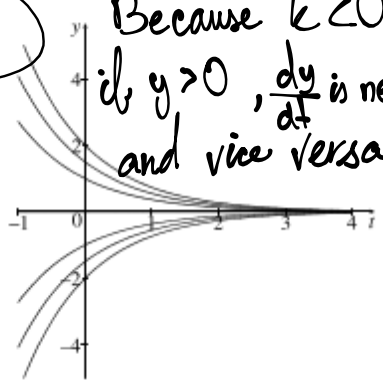
Class 1 Lecture Assignment

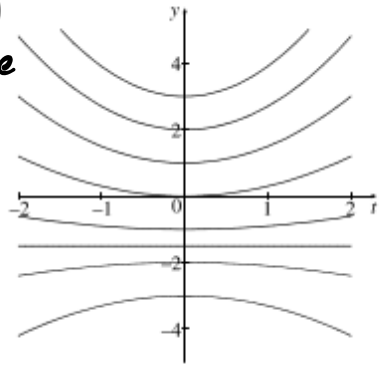
Complete this groupwork and submit it to Gradescope by 4:00pm on your class day. You can print this sheet, or write on your own paper. Contact us if internet connections or other issues require alternate arrangements.

1. The following three figures are graphs of families of functions. One of these families of functions contains solution curves to the differential equation $\frac{dy}{dt} = ky$, for some $k < 0$. Choose the correct family, and explain your choice briefly.

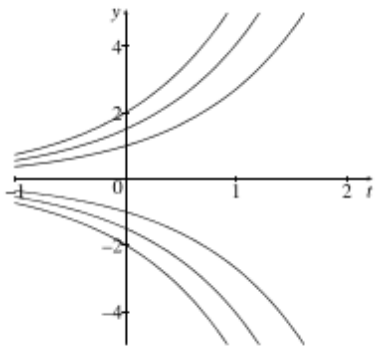
(a) Because $k<0$ if $y>0$, $\frac{dy}{dt}$ is negative and vice versa.



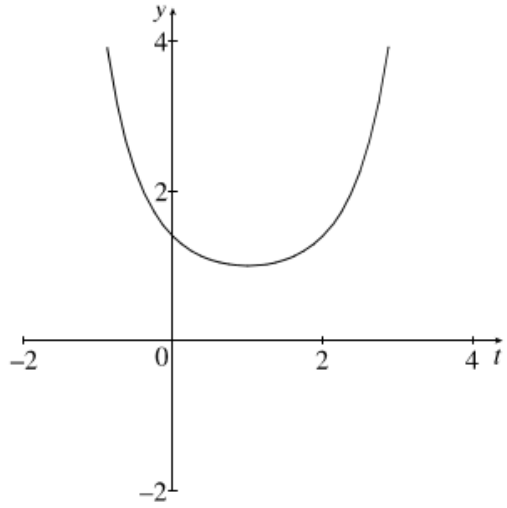
(b)



(c)



2. Now consider the following graph of $y = f(t)$:



The curve is a solution to one of the following differential equations. Find this equation and justify your answer:

(a) $y' = ty$ (b) $y' = (t-1)(y-1)$ (c) $y' = \left(\frac{t-1}{y}\right)^2$

The other choices don't fulfill condition $y'(0) > 0$

3. **One-minute questions:** Write a sentence for each.

(a) What is one interesting thing you learned from the book or videos?

I don't know for sure but is Euler's method how calculators compute DE's?

(b) What is one mathematical question you have about this week's material?

Can you use series to solve DEs?