

Quiz 4

Davis
M212

Name:
Pledge:

- (6pts.) 1. Verify that $y = 2 \sin(3x) + 4 \cos(3x)$ is a solution to the differential equation $y'' = -9y$.

Take the derivative twice, yielding $y' = 6 \cos(3x) - 12 \sin(3x)$; $y'' = -18 \sin(3x) - 36 \cos(3x)$. Plugging this into $y'' = -9y$ shows they are equal.

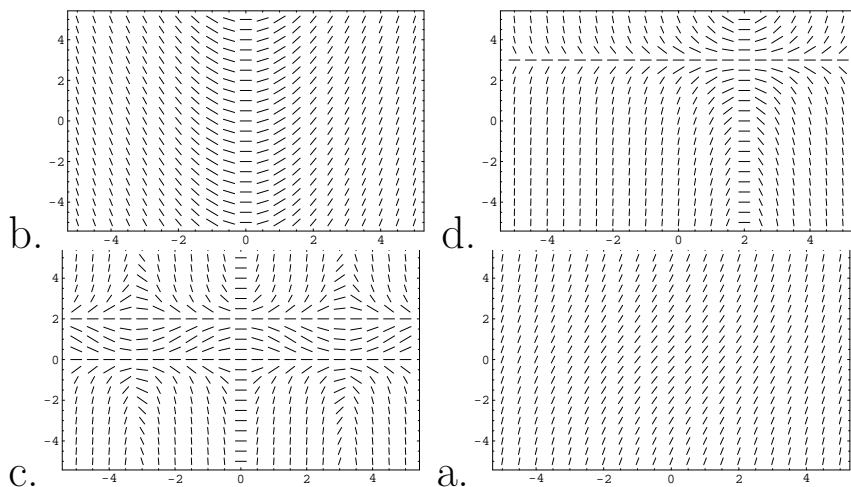
- (8pts.) 2. Match the differential equations below to their directions fields. Give a reason for each answer.

a. $y' = e^{x^2+y^2}$

b. $y' = x$

c. $y' = xy(y - 2)$

d. $y' = (y - 1)(x - 2)$



- The easiest way to see these is to look for the zeros of the derivative.
3. Use Euler's method with step size $h = 1$ to estimate the value of $y(3)$, where y is the solution of the initial value problem $y' = .5y(1 - y)$, $y(0) = .5$. (6pts.)

The first step will be $y_2 = .5 + (1)(.5)(.5)(.5) = .625$; the second step is $y_3 = .625 + (1)(.5)(.625)(.375) = .742$; the final step is $y_4 = .742 + (1)(.5)(.742)(.258) = .838$.