Name KEY

Math 285, Quiz #1, Spring 2012

Instructions: Show all work. You may use your calculator to check your work but answers only will be awarded no credit. Give exact answers whenever possible.

1. Determine which of the listed equations produced the graphs of direction fields below. Label the stationary points on each graph.

   a. $y' = 1 + 2y$ $y = -\frac{1}{2}$

   b. $y' = y(y-3)$

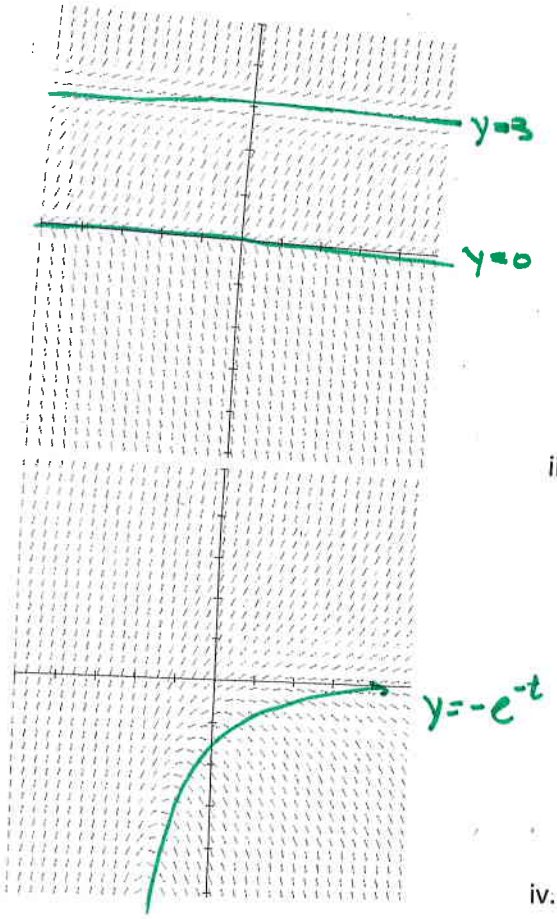
   c. $y' = -2 + t - y$

   d. $y' = y - 2$

   e. $y' = y(y-3)^2$

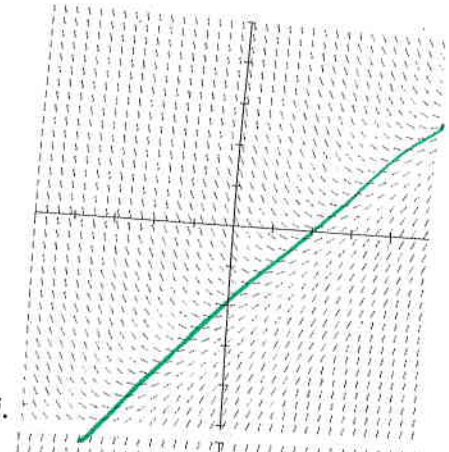
   f. $y' = e^{-t} + y$

i. E $y=3$ $y=0$

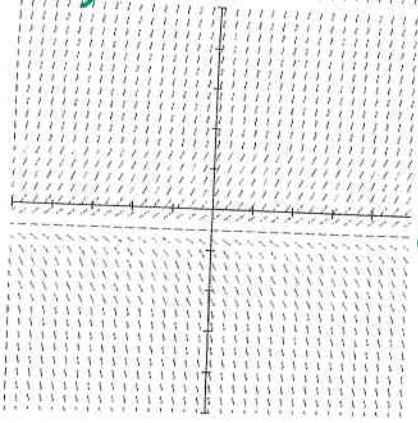


ii. F $y = -e^{-t}$

iii. $y = t-2$ C



iv. A $\leftarrow y = -\frac{1}{2}$



2. Determine the type of differential equation: a) is it linear or non-linear, b) ordinary or partial, c) and its order.

   a. $\frac{d^3y}{dt^3} + t\frac{dy}{dt} + (\cos^2 t)y = t^4$ 3rd order, linear, ordinary

   b. $u_t + uu_x = 1 + u_{xx}$ 2nd order, non-linear, partial

3. Solve the differential equation $2y' + y = 3t$ for the general solution. Use the back of this page to show your work.

$y' + \frac{1}{2}y = \frac{3}{2}t$

$\mu(t) = e^{\int \frac{1}{2}dt} = e^{\frac{1}{2}t}$

$u = \frac{3}{2}t \quad dv = e^{\frac{1}{2}t}$

$du = \frac{3}{2} \quad v = 2e^{\frac{1}{2}t}$

$e^{\frac{1}{2}t}y = 3te^{\frac{1}{2}t} - \int 3e^{\frac{1}{2}t}dt$