Week in Review # 11
Sections 10.2(some), 10.3, 10.4

Things to know:
- Be able to draw a slop field.
- Understand how to express a solution on a slope field.
- Know how to solve $y' = ky$ when given an initial condition.

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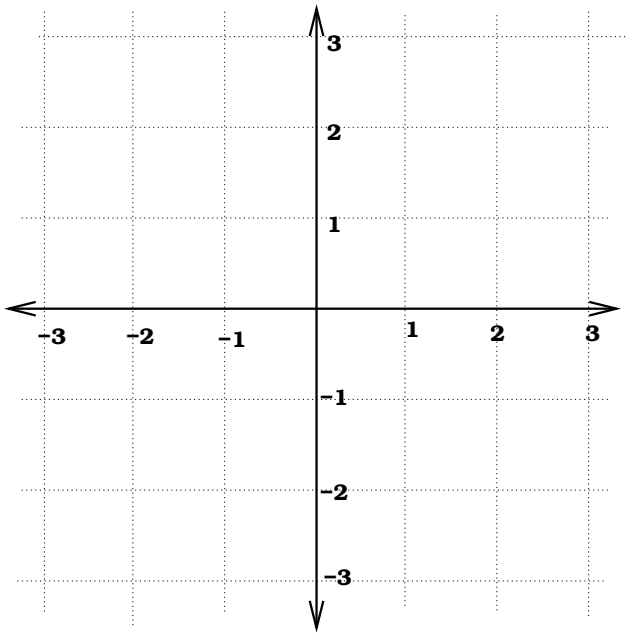
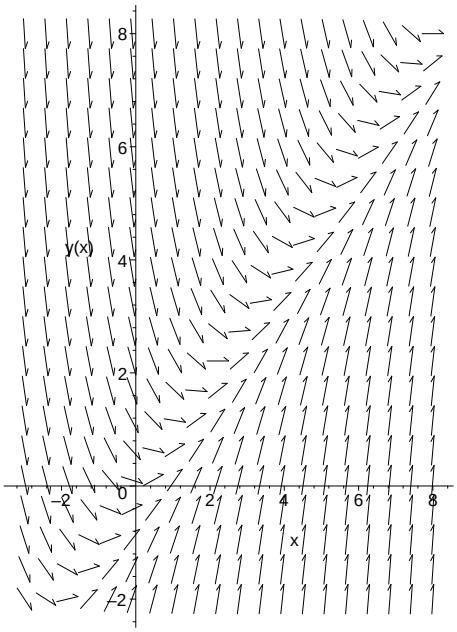
1. Is $y = 5e^x + xe^x$ is a solution to the differential equation $y'' + 2x = 3y$?

2. Find the values of n so that $y = 2x^n$ is a solution to $x^2y'' = 6y$

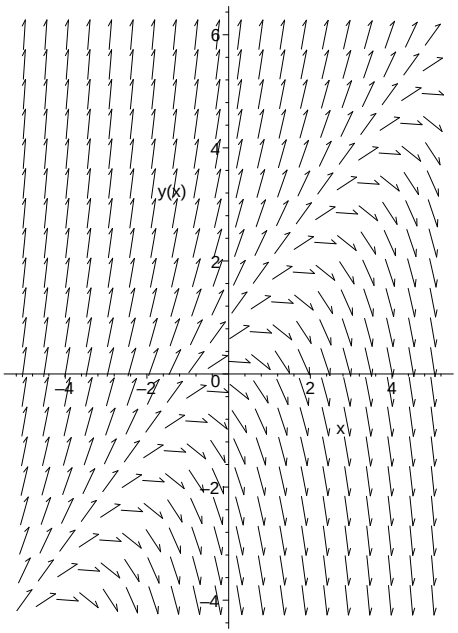
3. draw the slope field for $y' = xy$

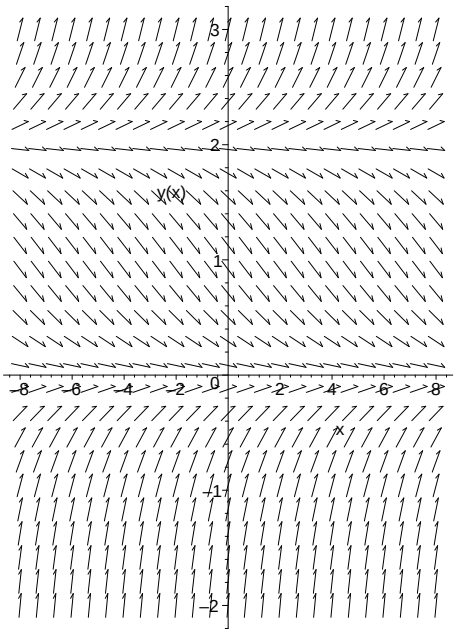


4. The slope field for the differential equation is given below. Draw the solution to the differential equation that has $y(0) = 3$



5. Match the slope field to the appropriate differential equation.





A) $y' = x + y$ B) $y' = 2 - y$ C) $y' = y - x$

D) $y' = 0.3(2 - y)y$ E) $y' = 0.3(y - 2)y$ F) $y' = x - y$

6. Solve these differential equations subject to the initial conditions.

   (a) $\frac{dy}{dx} = -.5y$ and $y = 8.4$ when $x = 0$.

   (b) $\frac{1}{y}\frac{dy}{dx} = 7$ and $y = 20$ when $x = 2$

   (c) $y' + 1.1y = 0$ and $y(1) = 3$

(d) $5y' - 9y = 0$ and $y(0) = 20$

7. A cup of coffee contains about 250 mg of caffeine. Caffeine is metabolized and the rate that it leaves the body is proportional to the amount of caffeine in the body. After 6 hours there are 75mg in the body.

   (a) Write a differential equation that measures the amount of caffeine, A, in the body as a function of the number of hours, x, since the coffee was consumed.

   (b) Solve this differential equation.