AP Calculus
Slope Fields

Name______________________________
Application of Integration Day 7

1. Show that $y=\frac{2}{3}e^{x}+e^{-2x}$ is a solution of the differential equation $y'+2y=2e^{x}$.

2. Verify that $y=-t\cos t-t$ is a solution of the initial-value problem $t\frac{dy}{dt}=y+t^{2}\sin t \quad y(\pi)=0$

3. Which of the following functions are solutions of the differential equation $y''+y=\sin x$?

A. $y=\sin x$

B. $y=\cos x$

C. $y=\frac{1}{2}x\sin x$

D. $y=-\frac{1}{2}x\cos x$

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4-7: Match the differential equation with its direction field (labeled I-IV). Give reason for your answer.

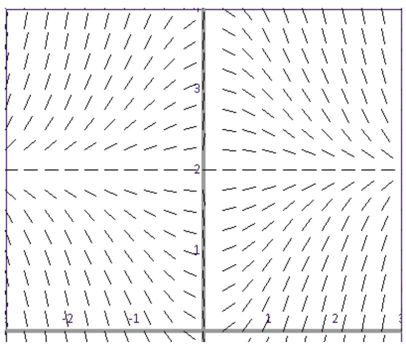
4. $y' = 2 - y$

5. $y' = x(2 - y)$

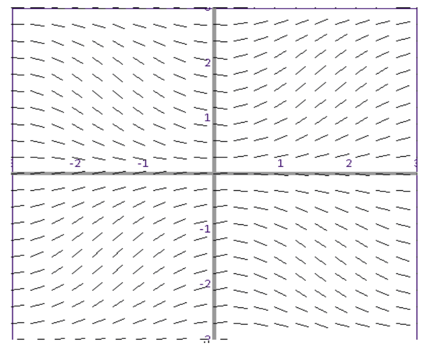
6. $y' = x + y - 1$

7. $y' = \sin x \sin y$

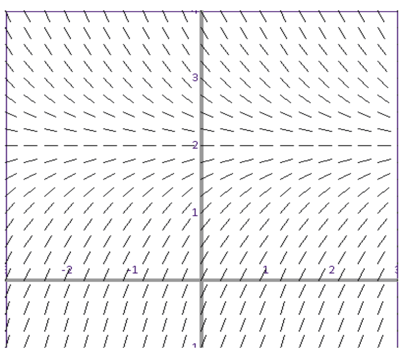
I.



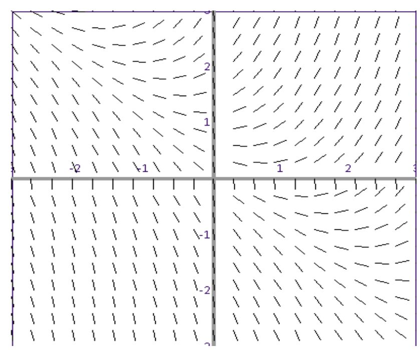
II.



III.

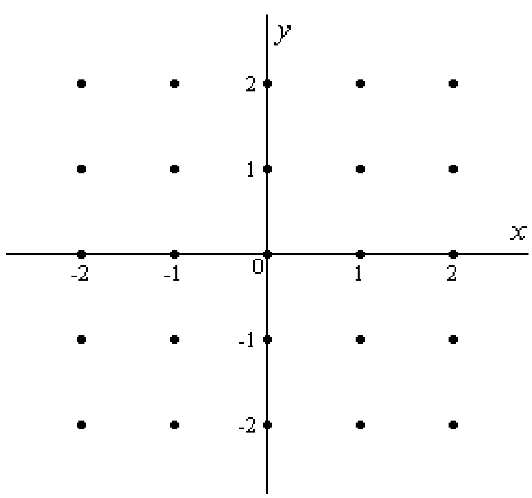


IV.

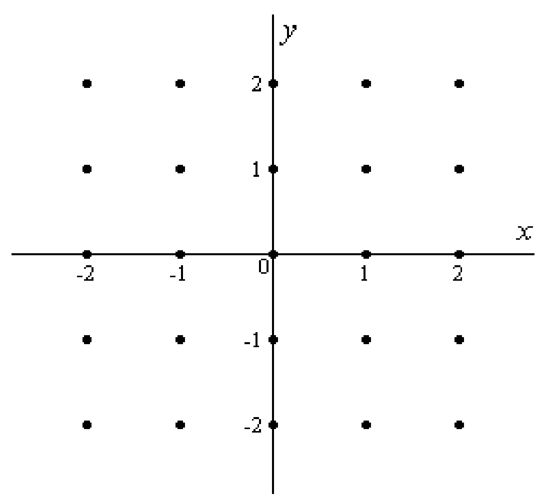


8-9: Sketch the direction field of the differential equation. Then use it to sketch a solution curve that passes through the given point.

8. $y' = y - 2x$, $(1,0)$



9. $y' = x + y^2$, $(0,0)$



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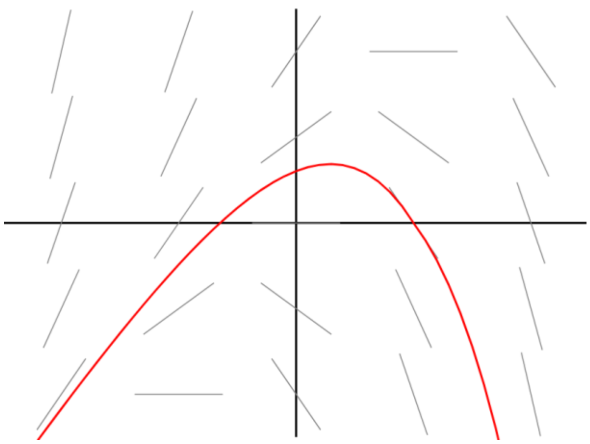
Answers:

1. Show work to verify $2e^x = 2e^x$
2. Show work to verify $0 = 0$
3. D
4. III
5. I
6. IV
7. II
8. 
9.