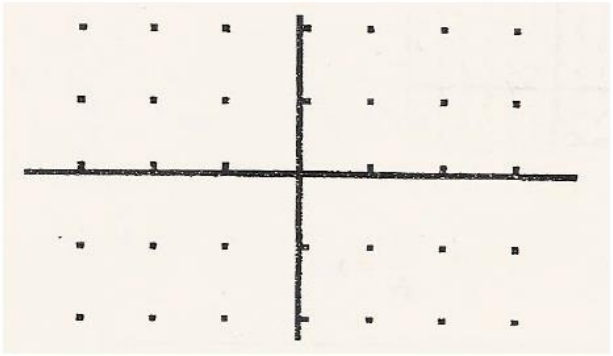
AP Calculus Name_____

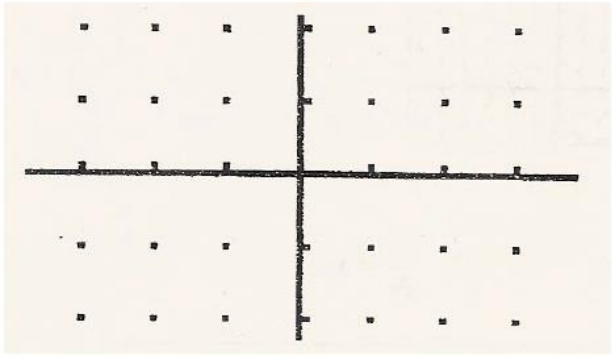
Slope Fields Application of Integration Day 7

Draw a slope field for each of the following differential equations.

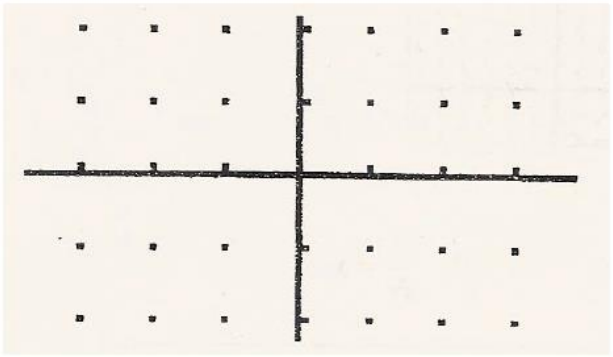
1. $\frac{dy}{dx} = x + 1$



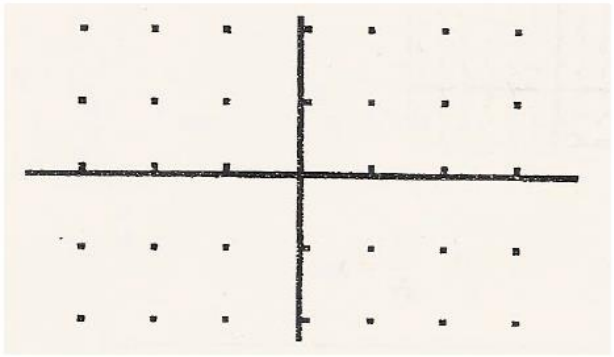
2. $\frac{dy}{dx} = 2y$



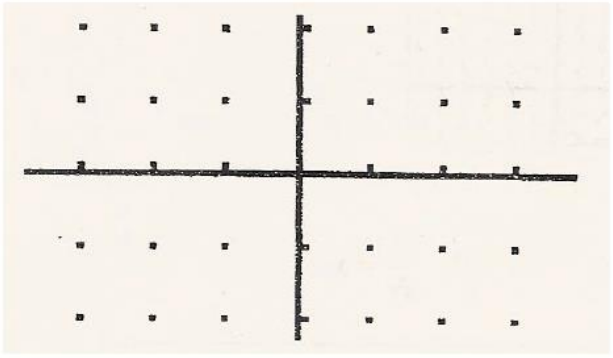
3. $\frac{dy}{dx} = x + y$



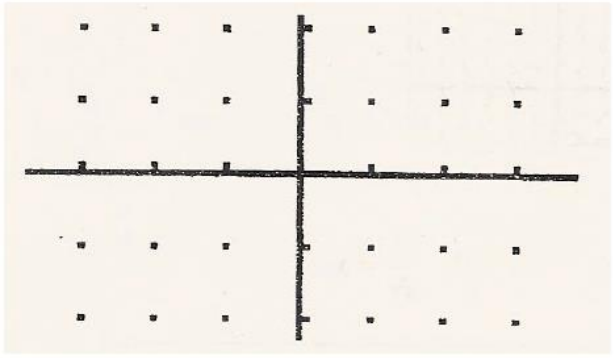
4. $\frac{dy}{dx} = 2x$



5. $\frac{dy}{dx} = y - 1$



6. $\frac{dy}{dx} = -\frac{y}{x}$



AP Calculus Name_____

Slope Fields Application of Integration Day 7

Match the slope fields with their differential equations.

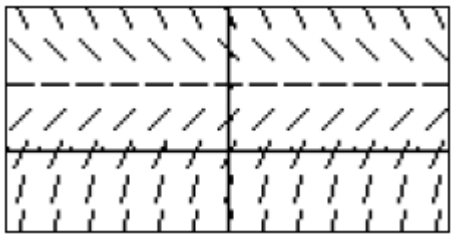
7. $\frac{dy}{dx} = \sin x$

8. $\frac{dy}{dx} = x - y$

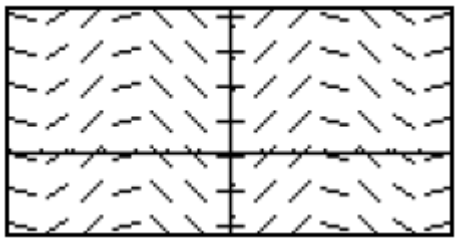
9. $\frac{dy}{dx} = 2 - y$

10. $\frac{dy}{dx} = x$

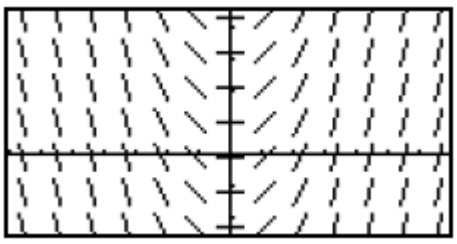
A.



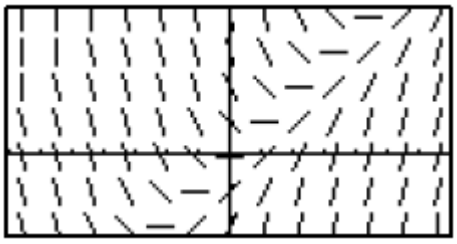
C.



B.



D.



Match the slope fields with their differential equations.

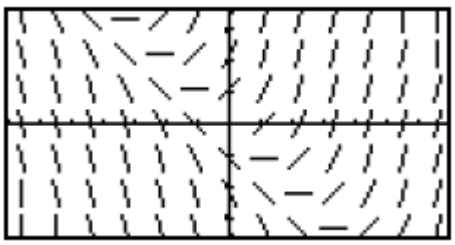
11. $\frac{dy}{dx} = 0.5x - 1$

12. $\frac{dy}{dx} = 0.5y$

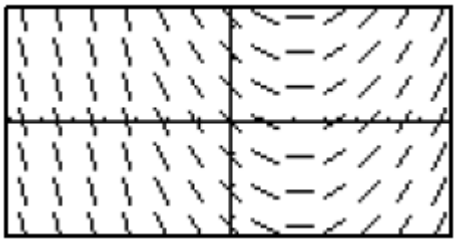
13. $\frac{dy}{dx} = -\frac{x}{y}$

14. $\frac{dy}{dx} = x + y$

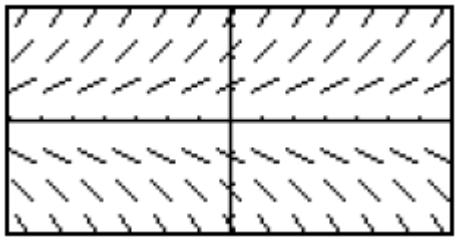
A.



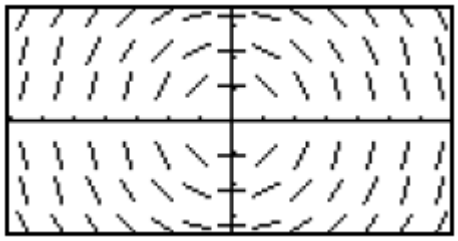
C.



B.

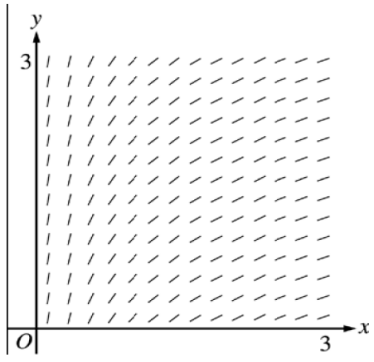


D.



The slope field from a certain differential equation is shown. Which of the following could be a specific solution to the differential equation?

15.



A.) $y = x^2$

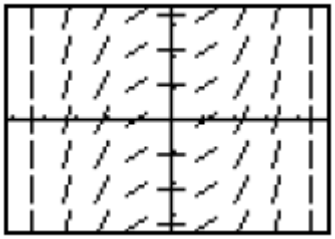
B.) $y = e^x$

C.) $y = e^{-x}$

D.) $y = \cos x$

E.) $y = \ln x$

16.



A.) $y = \sin x$

B.) $y = \cos x$

C.) $y = x^2$

D.) $y = \frac{1}{6}x^3$

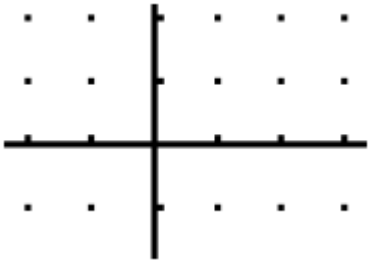
E.) $y = \ln x$

AP Calculus
Slope Fields

Name_____
Application of Integration Day 7

17. Consider the differential equation given by $\frac{dy}{dx} = \frac{xy}{2}$.

A.) On the axes provided, sketch a slope field for the given differential equation.



B.) Let f be the function that satisfies the given differential equation. Write an equation for the tangent line to the curve of y=f(x) through the point (1,1). Then use your tangent line equation to estimate the value of f(1.2).

C.) Given the particular solution y=f(x) to the differential equation with the initial condition f(1)=1 is $y = e^{\frac{1}{4}x^2 - \frac{1}{4}}$. Use this solution to find f(1.2).

D.) Compare your estimate of f(1.2) found in part B to the actual value of f(1.2) found in part C.

E.) Was your estimate in part b and underestimate or an overestimate? Use your slope field to explain why.

18. Consider the differential equation given by $\frac{dy}{dx} = \frac{x}{y}$.

A.) On the axes provided, sketch a slope field for the given differential equation.

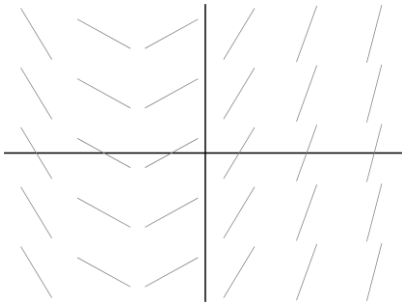
B.) Sketch a solution curve that passes through the point (0,1) on your slope field.
C.) Find the particular solution y=f(x) to the differential equation with the initial condition f(0)=1.

D.) Sketch a solution curve that passes through the point (0,-1) on your slope field.
E.) Find the particular solution y=f(x) to the differential equation with the initial condition f(0)=-1.

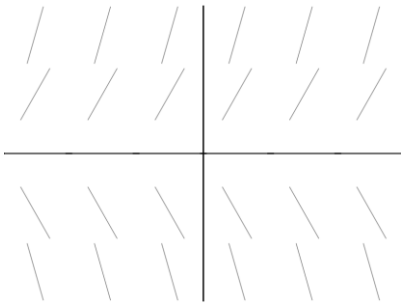
AP Calculus
Slope Fields
Answers:

Name_____
Application of Integration Day 7

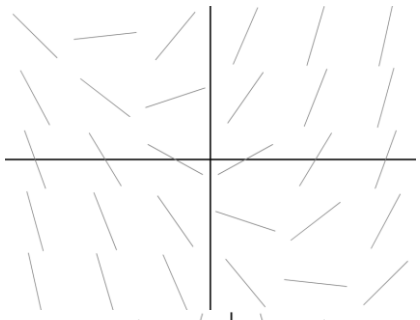
1.



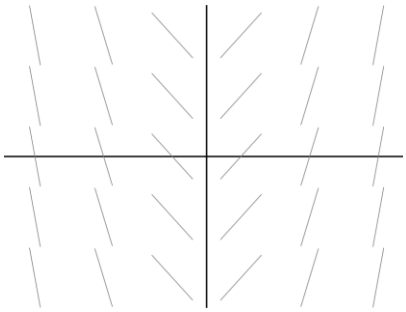
2.



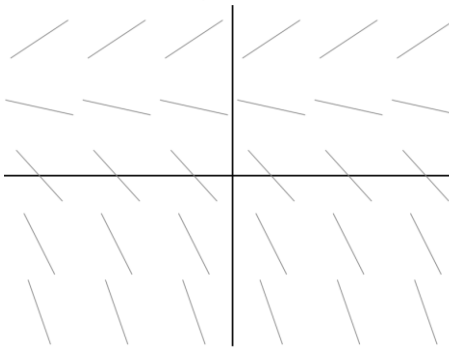
3.



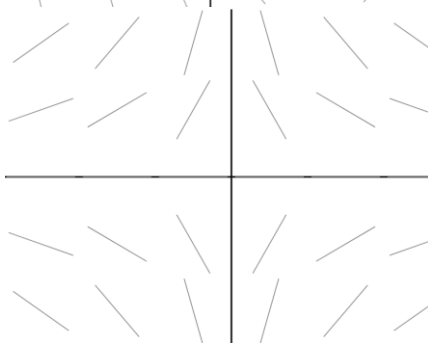
4.



5.



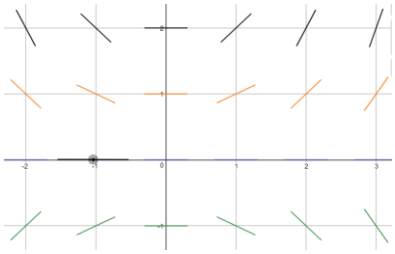
6.



7. C 8. D 9. A 10. B 11. C 12. B 13. D 14. A

15. E 16. D

17. a.



b. $y-1=\frac{1}{2}(x-1)$

$y=\frac{1}{2}(x-1)+1$

$y(1.2)=\frac{1}{2}(1.2-1)+1=\frac{11}{10}=1.1$

c.) $y=e^{\frac{1}{4}x^2-\frac{1}{4}}$

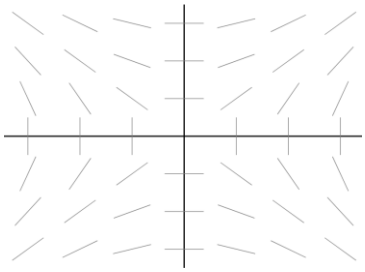
$y(1.2)\approx 1.11627807$

d.) $error=|app-actual|$

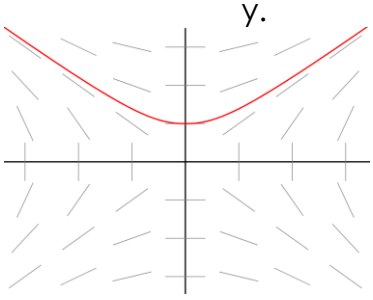
$error=0.01627807$

e. Estimate was an under estimate because y is concave up so the tangent line lies below y.

18. a.



b.



c.