

Graphing Differential Equations

1. Match the slope field with their differential equation.

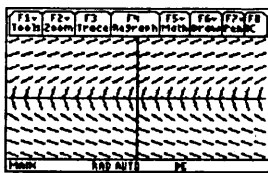
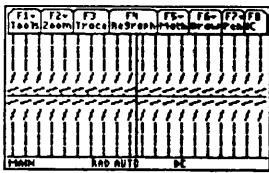
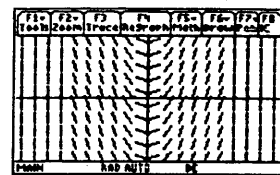
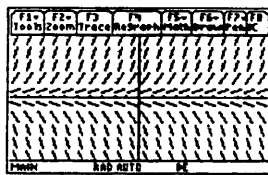
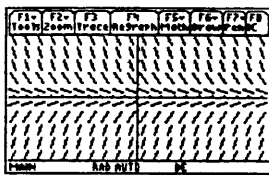
a. $\frac{dy}{dx} = -y$

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

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

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

d. $\frac{dy}{dx} = \frac{1}{y}$



2. Match the slope field with their differential equation.

a. $\frac{dy}{dx} = 1 + y^2$

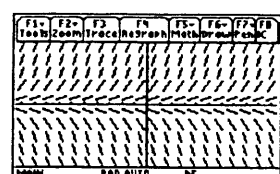
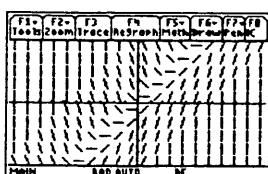
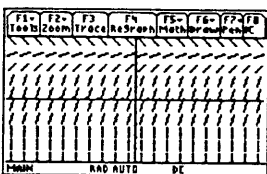
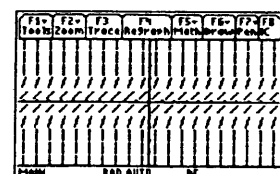
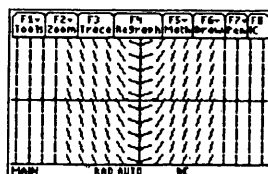
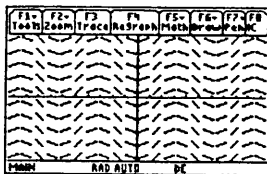
c. $\frac{dy}{dx} = \sin(x)$

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

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

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

f. $\frac{dy}{dx} = 4 - y$



4. Match the slope fields with their differential equations.

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

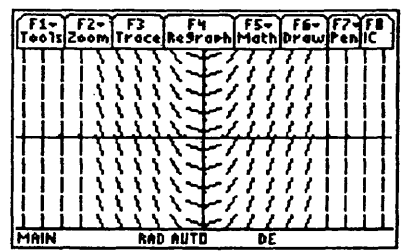
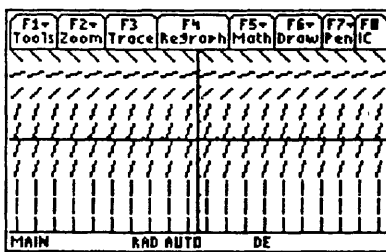
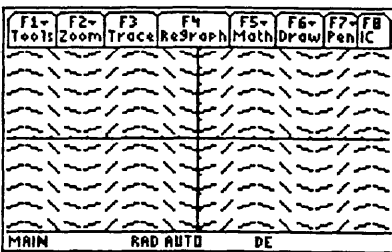
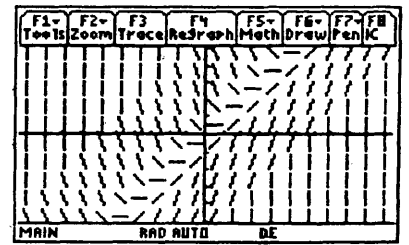
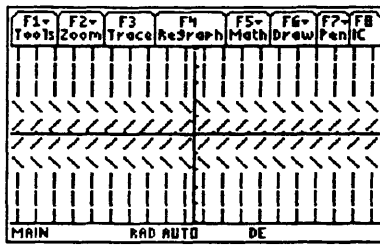
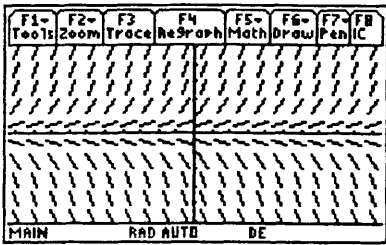
c. $\frac{dy}{dx} = 1 + y^2$

e. $\frac{dy}{dx} = 4 - y$

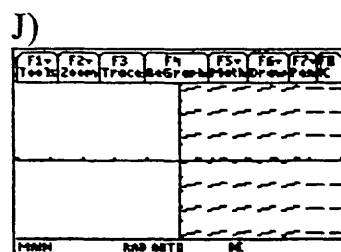
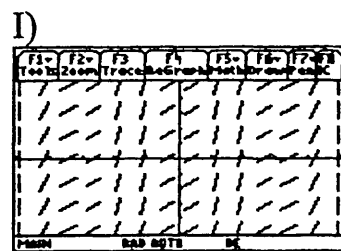
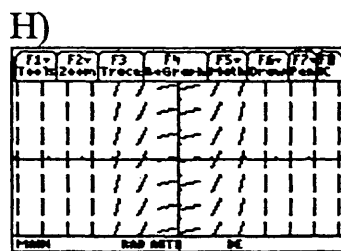
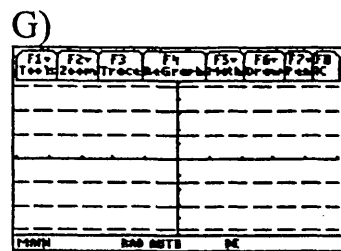
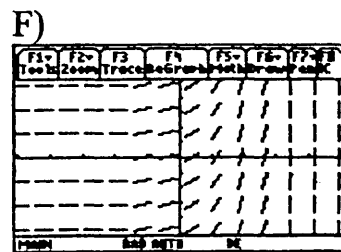
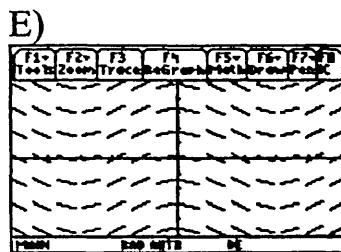
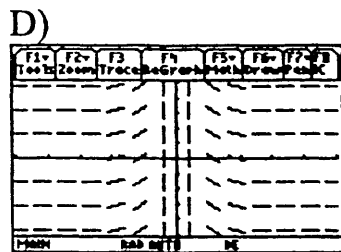
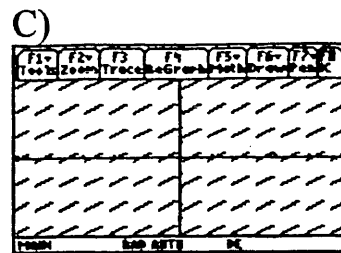
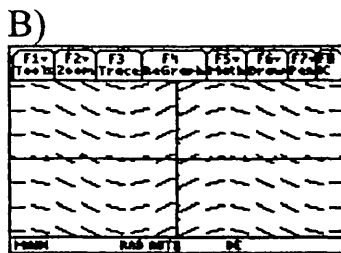
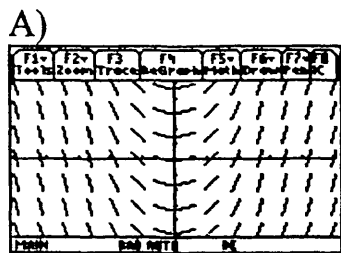
b. $\frac{dy}{dx} = \sin(x)$

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

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



Match each slope field with the equation that the slope field could represent:



1. _____ $y = x$

2. _____ $y = x^2$

3. _____ $y = e^x$

4. _____ $y = \frac{1}{x^2}$

5. _____ $y = x^3$

6. _____ $y = \sin x$

7. _____ $y = \cos x$

8. _____ $y = \sqrt{x}$

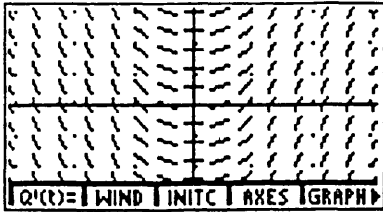
9. _____ $y = 1$

10. _____ $y = \tan x$

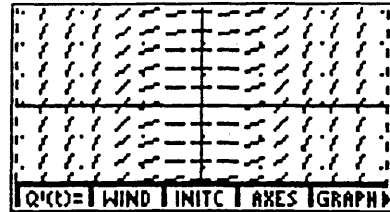
11. Choose the slope field which matches the information given in the chart. Explain your choice.

x	y	dy/dx
-2	2	-4
0	1	0
1	1	2

a)

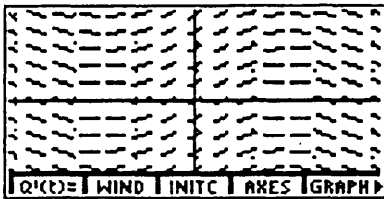


b)

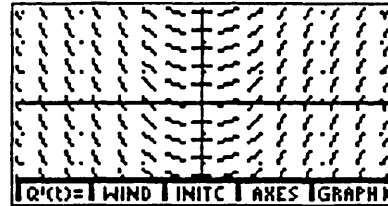


12. Below are 6 examples of Slope Fields. The windows are $[-3.1, 3.1] \times [-3.1, 3.1]$, unless noted. Match them with their differential equations. Explain your choice.

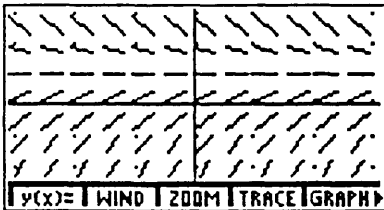
a)



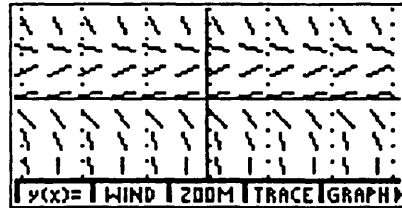
b)



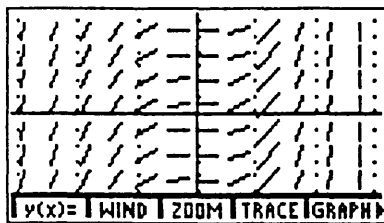
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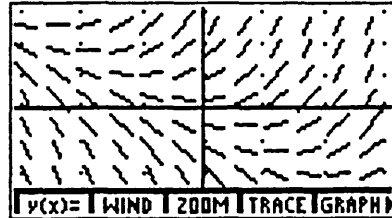
d)



e)



f)



$[-3.1, 3.1] \times [-6.4, 6]$

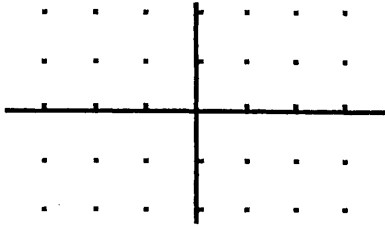
$[-3.1, 3.1] \times [-6.4, 6.4]$

- A. $\frac{dy}{dx} = 3x^2$ B. $\frac{dy}{dx} = 1 - y$ C. $\frac{dy}{dx} = \cos x$ D. $\frac{dy}{dx} = x + y$ E. $\frac{dy}{dx} = 2x$ F. $\frac{dy}{dx} = y(3 - y)$

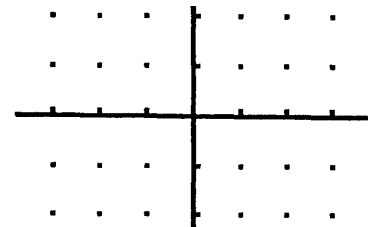
SLOPE FIELDS

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

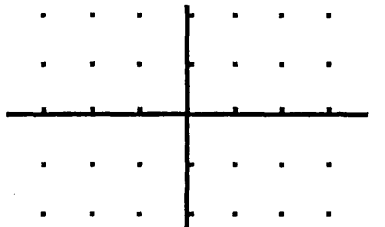
1. $\frac{dy}{dx} = x + 1$



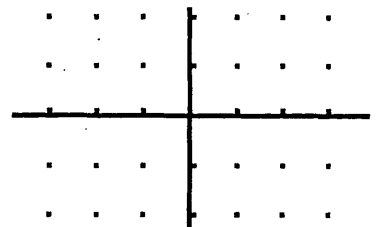
2. $\frac{dy}{dx} = 2y$



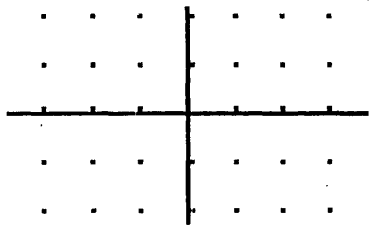
3. $\frac{dy}{dx} = x + y$



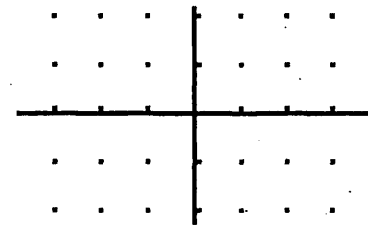
4. $\frac{dy}{dx} = 2x$



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

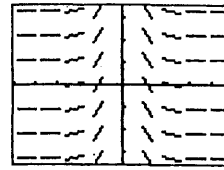


6. $\frac{dy}{dx} = -\frac{y}{x}$

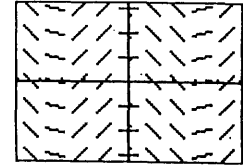


Match each slope field with the equation that the slope field could represent.

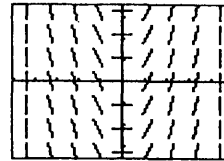
(A)



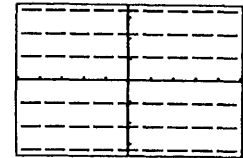
(B)



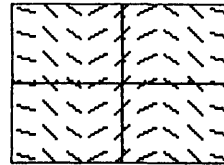
(C)



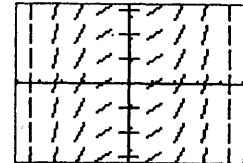
(D)



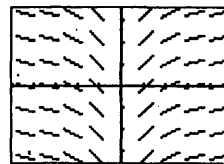
(E)



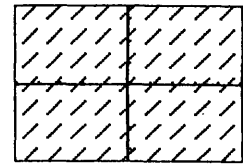
(F)



(G)



(H)



7. $y = 1$

11. $y = \frac{1}{x^2}$

8. $y = x$

12. $y = \sin x$

9. $y = x^2$

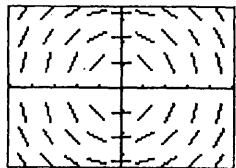
13. $y = \cos x$

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

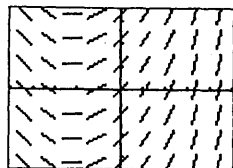
14. $y = \ln|x|$

Match the slope fields with their differential equations.

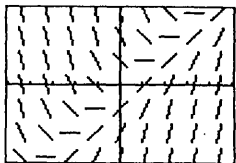
(A)



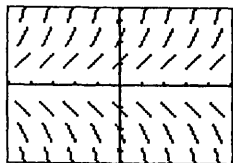
(B)



(C)



(D)



15. $\frac{dy}{dx} = \frac{1}{2}x + 1$

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

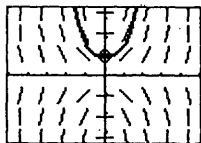
16. $\frac{dy}{dx} = y$

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

19. The calculator drawn slope field for the differential equation $\frac{dy}{dx} = xy$ is shown in the figure below. The solution curve passing through the point $(0, 1)$ is also shown.

(a) Sketch the solution curve through the point $(0, 2)$.

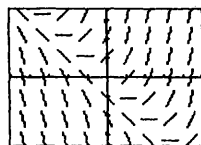
(b) Sketch the solution curve through the point $(0, -1)$.



20. The calculator drawn slope field for the differential equation $\frac{dy}{dx} = x + y$ is shown in the figure below.

(a) Sketch the solution curve through the point $(0, 1)$.

(b) Sketch the solution curve through the point $(-3, 0)$.

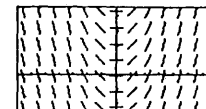


Match the slope fields with their differential equations.

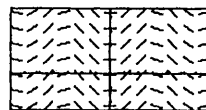
(A)



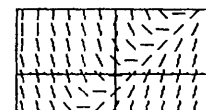
(B)



(C)



(D)



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

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

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

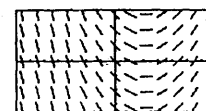
10. $\frac{dy}{dx} = x$

Match the slope fields with their differential equations.

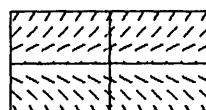
(A)



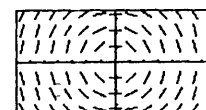
(B)



(C)



(D)



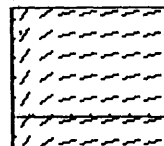
11. $\frac{dy}{dx} = .5x - 1$

12. $\frac{dy}{dx} = .5y$

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

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

15. (From the AP Calculus Course Description)



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

(A) $y = x^2$

(B) $y = e^x$

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

(D) $y = \cos x$

(E) $y = \ln x$