

Graphing Differential Equations

1. Match the slope field with their differential equation.

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

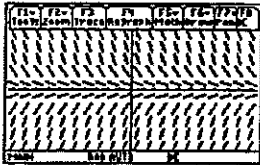
c. $\frac{dy}{dx} = x$

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

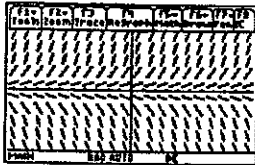
b. $\frac{dy}{dx} = y$

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

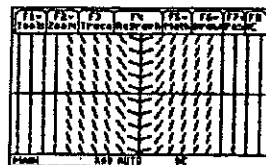
A



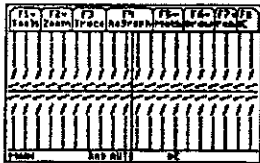
B



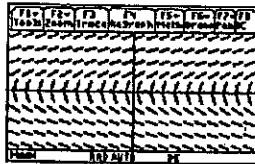
C



E



D



2. Match the slope field with their differential equation.

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

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

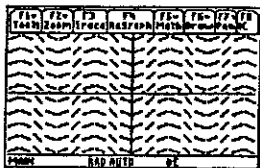
e. $\frac{dy}{dx} = x - y$

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

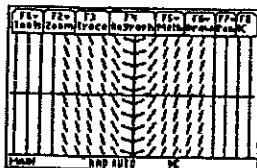
d. $\frac{dy}{dx} = x$

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

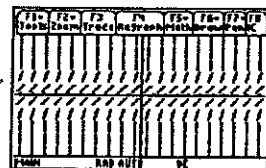
C



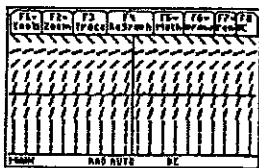
D



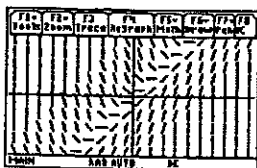
A



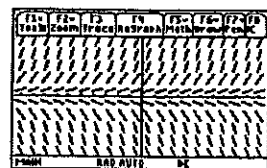
F



E



D



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

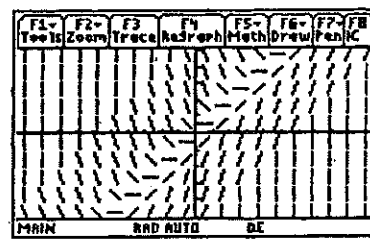
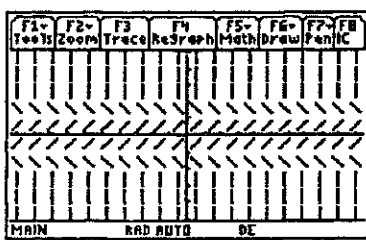
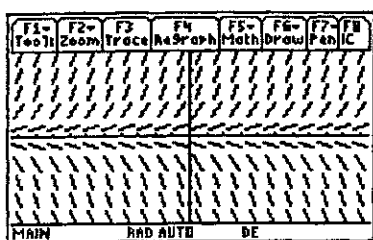
d. $\frac{dy}{dx} = x$

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

F

X

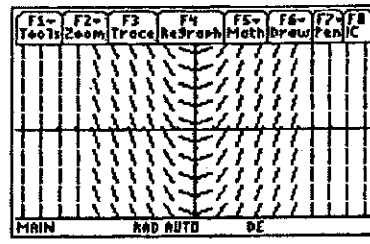
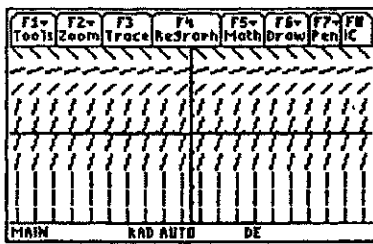
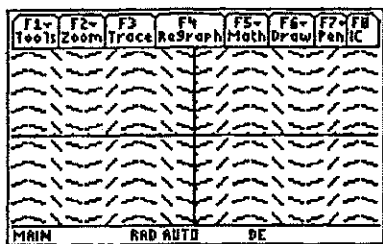
A



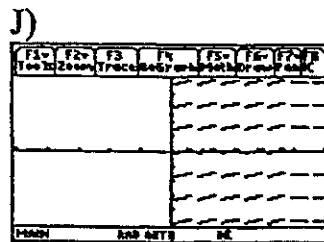
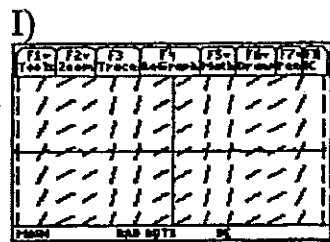
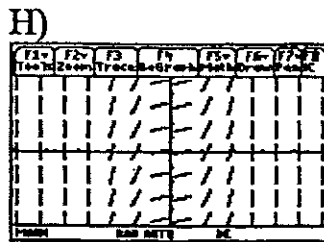
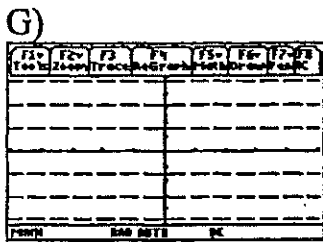
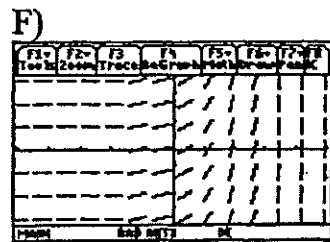
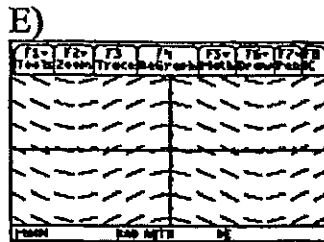
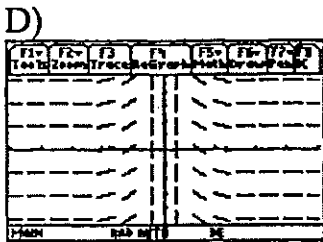
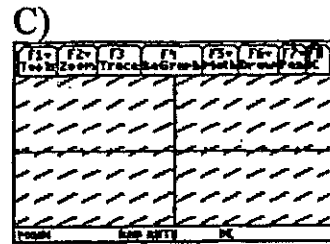
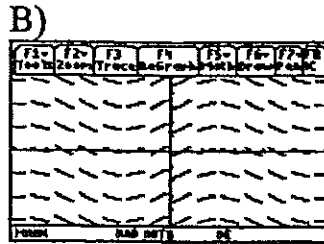
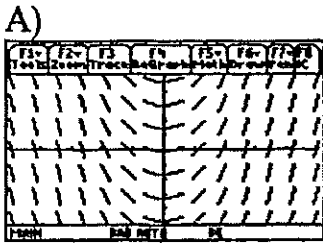
B

E

D



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



1. C $y = x$

2. A $y = x^2$

3. F $y = e^x$

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

5. H $y = x^3$

6. B $y = \sin x$

7. E $y = \cos x$

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

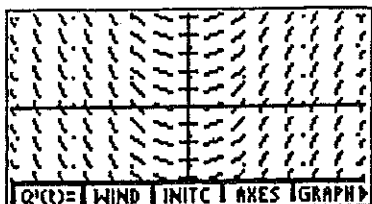
9. G $y = 1$

10. I $y = \tan x$

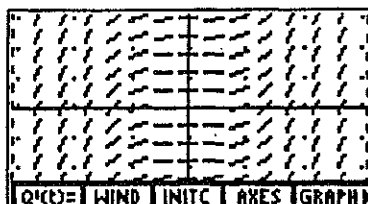
11. Choose the slope field which matches the information given in the chart. Explain your choice.

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

a)

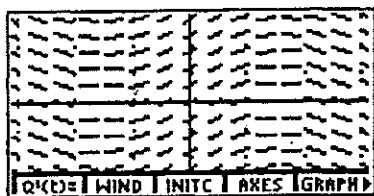


b)

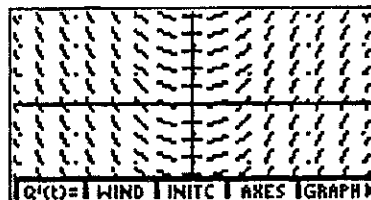


12. Below are 6 examples of Slope Fields. The windows are $[-3.1, 3.1] \times [-3.1, 3.1]$, unless noted. Match them with their differential equations. Explain your choice.

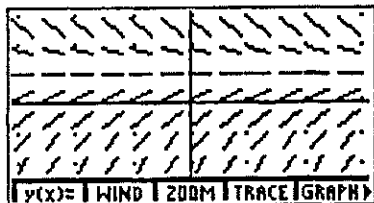
a)



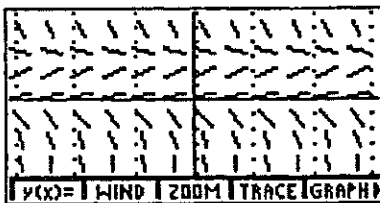
b)



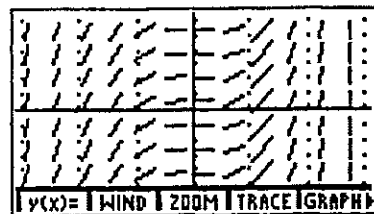
c)



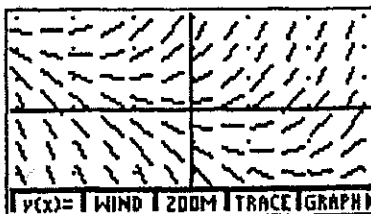
d)



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. $\frac{dy}{dx} = y(3 - y)$

(E)

(C)

(A)

(F)

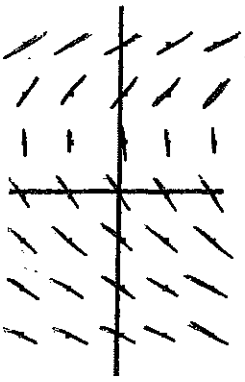
(B)

(D)

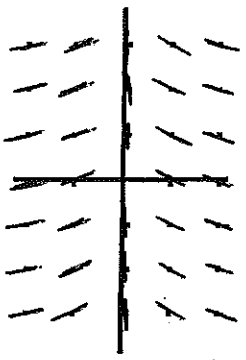
SLOPE FIELDS

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

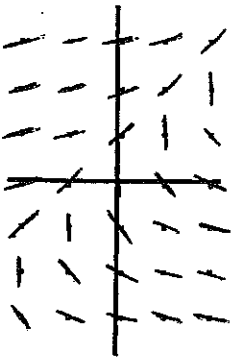
1. $\frac{dy}{dx} = x+1$



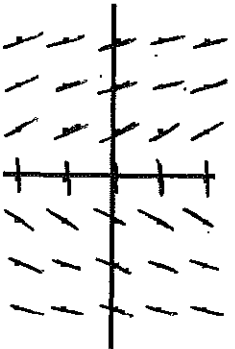
2. $\frac{dy}{dx} = 2x$



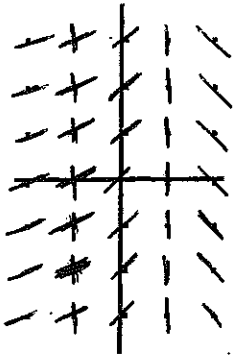
3. $\frac{dy}{dx} = x+y$



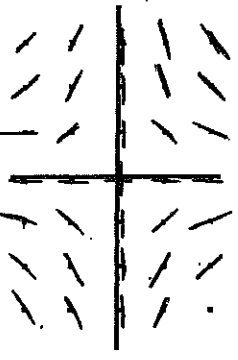
4. $\frac{dy}{dx} = 2x$



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

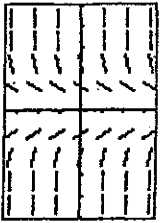


6. $\frac{dy}{dx} = -\frac{y}{x}$

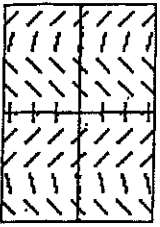


Match each slope field with the equation that the slope field could represent.

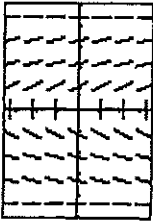
(A)



(B)



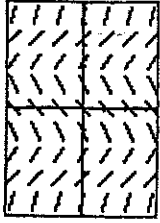
(C)



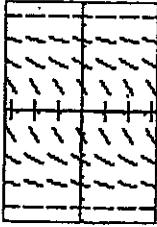
(D)



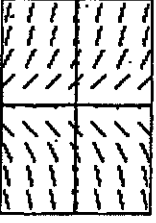
(E)



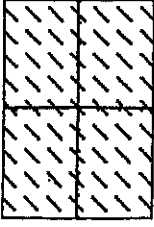
(F)



(G)



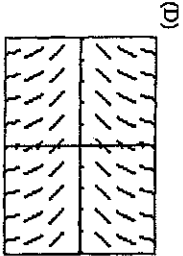
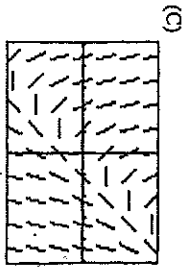
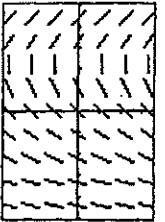
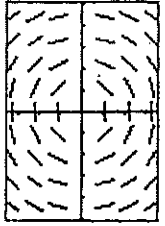
(H)



- 7. $y=1$ (D)
- 8. $y=x$ (H)
- 9. $y=x^2$ (E)
- 10. $y=\frac{1}{6}x^3$ (F)

- 11. $y=\frac{1}{x^2}$ (A)
- 12. $y=\sin x$ (G)
- 13. $y=\cos x$ (B)
- 14. $y=\ln|x|$ (C)

Match the slope fields with their differential equations.



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

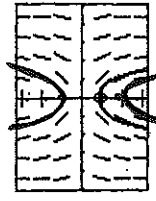
17. $\frac{dy}{dx} = x - y$ (C)

16. $\frac{dy}{dx} = y$ (D)

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

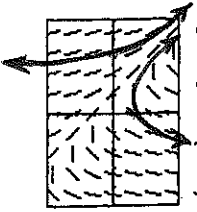
19. The calculator drawn slope field for the differential equation $\frac{dy}{dx} = xy$ is shown in the figure below. The solution curve passing through the point (0, 1) is also shown.

- (a) Sketch the solution curve through the point (0, 2).
 (b) Sketch the solution curve through the point (0, -1).

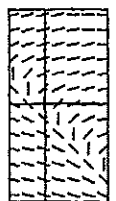
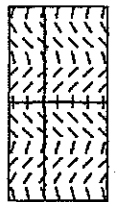
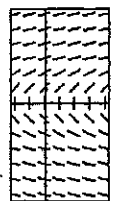
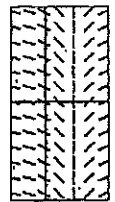


20. The calculator drawn slope field for the differential equation $\frac{dy}{dx} = x + y$ is shown in the figure below.

- (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.



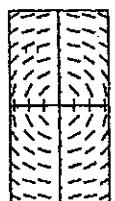
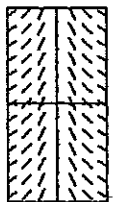
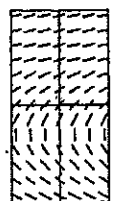
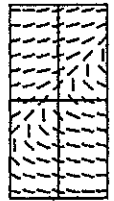
7. $\frac{dy}{dx} = \sin x$ (C)

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

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

10. $\frac{dy}{dx} = x$ (B)

Match the slope fields with their differential equations.



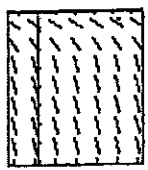
11. $\frac{dy}{dx} = 5x - y$ (B)

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

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

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

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) $y = \ln x$

$y' = -e^{-x}$
 $y' = \frac{1}{x}$