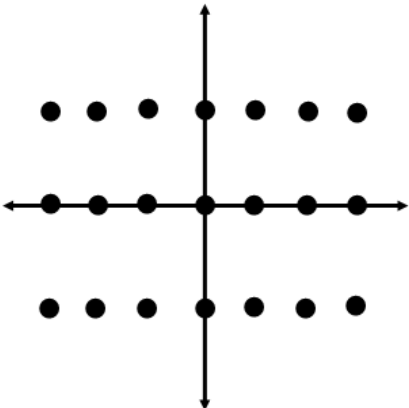


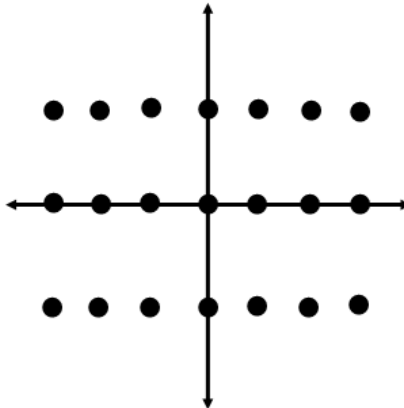
SLOPE FIELDS

Sketch the differential equation.

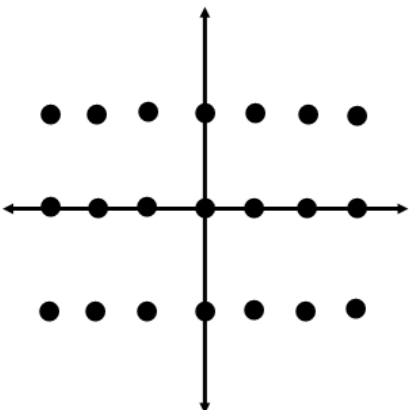
1. $\frac{dy}{dx} = x + 1$



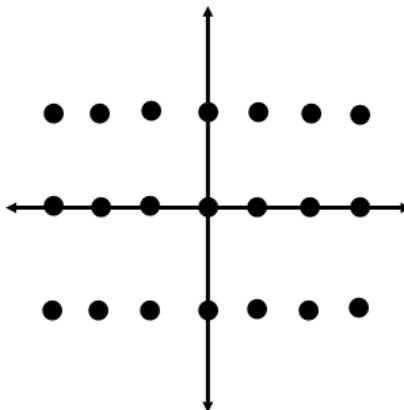
2. $\frac{dy}{dx} = 2y$



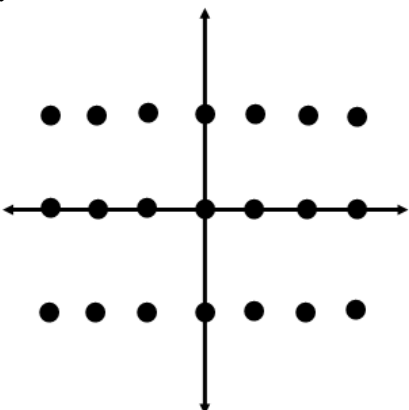
3. $\frac{dy}{dx} = x + y$



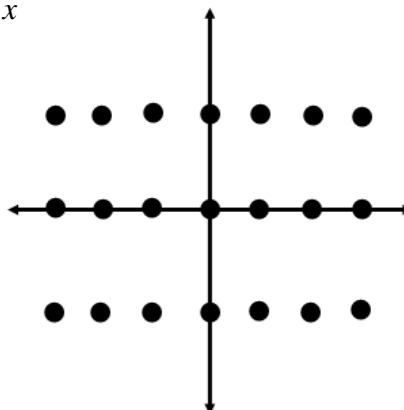
4. $\frac{dy}{dx} = 2x$



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

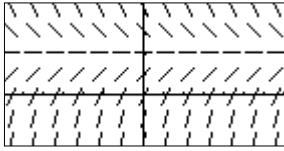


6. $\frac{dy}{dx} = -\frac{y}{x}$

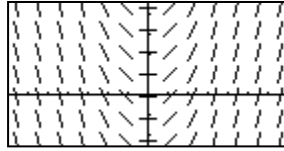


Match the slope fields with their differential equations.

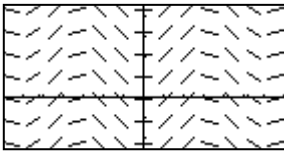
(A)



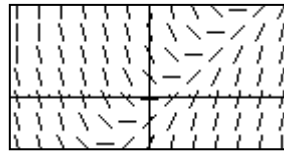
(B)



(C)



(D)



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

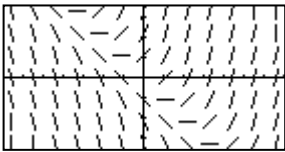
8. $\frac{dy}{dx} = x - y$

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

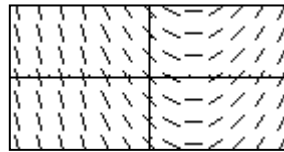
10. $\frac{dy}{dx} = x$

Match the slope fields with their differential equations.

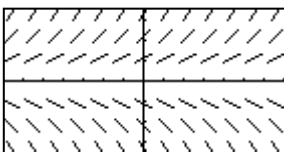
(A)



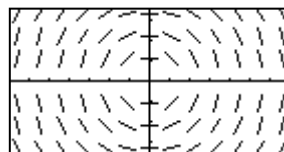
(B)



(C)



(D)

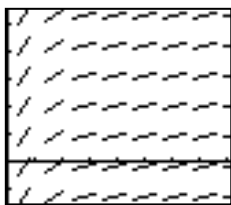


11. $\frac{dy}{dx} = .5x - 1$

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

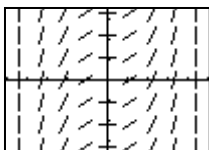
13. $\frac{dy}{dx} = -\frac{x}{y}$

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



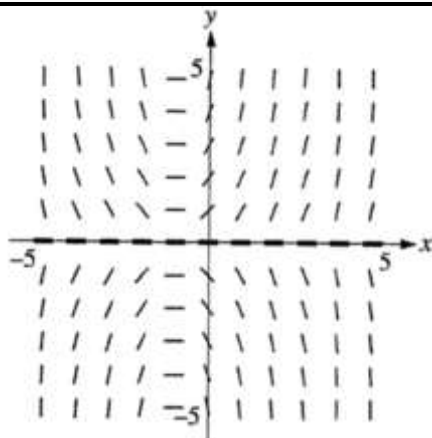
15. The slope field from a certain differential equation is shown above. Which of the following could be a specific solution to that differential equation?

- (A) $y = x^2$ (B) $y = e^x$ (C) $y = e^{-x}$ (D) $y = \cos x$ (E) $y = \ln x$



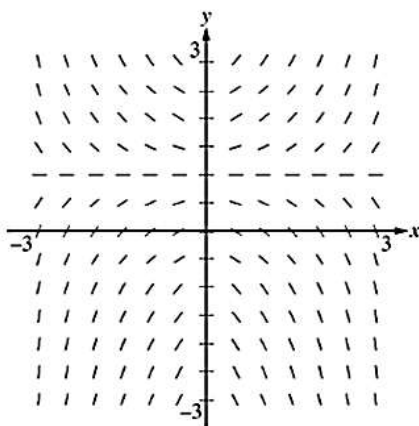
16. The slope field for a certain differential equation is shown above. Which of the following could be a specific solution to that differential equation?

- (A) $y = \sin x$ (B) $y = \cos x$ (C) $y = x^2$ (D) $y = \frac{1}{6}x^3$ (E) $y = \ln x$



17. Shown above is a slope field for which of the following differential equations?

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



18. Shown above is a slope field for which of the following differential equations?

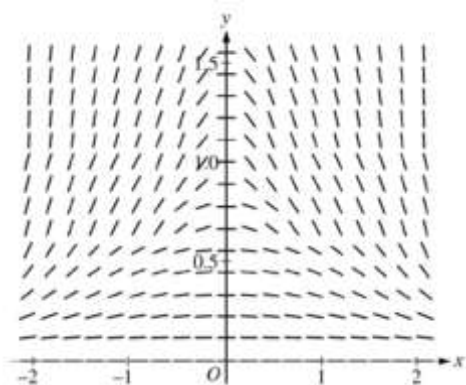
(A) $\frac{dy}{dx} = xy - x$

(B) $\frac{dy}{dx} = xy + y$

(C) $\frac{dy}{dx} = y - x^2$

(D) $\frac{dy}{dx} = (y - 1)x^2$

(E) $\frac{dy}{dx} = (y - 1)^3$



19. The slope field for a certain differential equation is shown above. Which of the following could be a solution to the differential equation with initial condition $y(0) = 1$?

(A) $y = \cos x$

(B) $y = 1 - x^2$

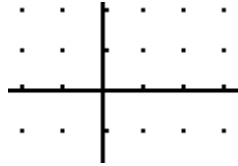
(C) $y = e^x$

(D) $y = \sqrt{1 - x^2}$

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

20. 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 $y = f(x)$ through the point $(1, 1)$. Then use your tangent line equation to estimate the value of $f(1.2)$

(c) Find the particular solution $y = f(x)$ to the differential equation with the initial condition $f(1) = 1$. Use your 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). Was your estimate from part (b) an underestimate or an overestimate? Use your slope field to explain why.

21. 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 $f(0) = -1$.

Answers to Worksheet on Slope Fields

1. – 6. Graphs

7. C

8. D

9. A

10. B

11. B

12. C

13. D

14. A

15. E

16. D

17. E

18. E

19. E

20. (a) graph

(b) $y = 1 + \frac{1}{2}(x-1)$, 1.1

(c) $y = e^{\frac{x^2-1}{4}}$, 1.116

(d) underestimate

21. (a) and (b) graphs

(c) $y = \sqrt{x^2 + 1}$

(d) graph

(e) $y = -\sqrt{x^2 + 1}$