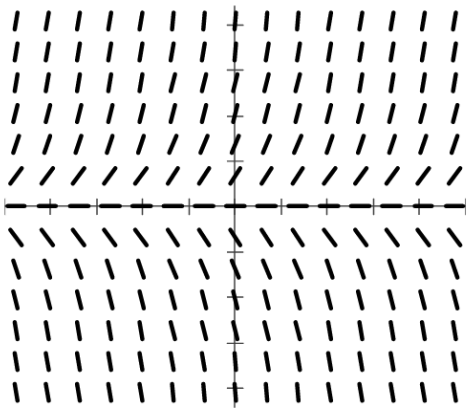
Problems and Examples

4. The slope field for a differential equation is shown at the right. Which statement is true for solutions of the differential equation?



I. For $x < 0$ all solutions are decreasing.

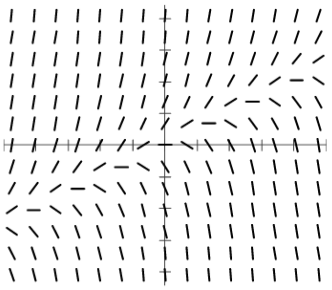
II. All solutions level off near the x-axis.

III. For $y > 0$ all solutions are increasing.

(A) I only (B) II only (C) III only

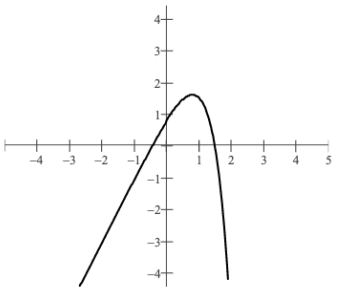
(D) II and III only (E) I, II, and III

5.

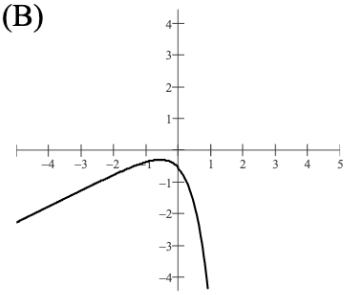


Which one of the following could be the graph of the solution of the differential equation whose slope field is shown above?

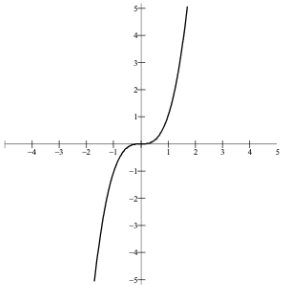
(A)



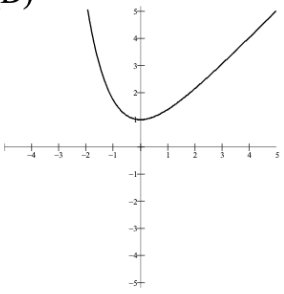
(B)



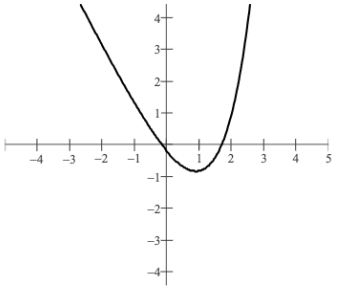
(C)



(D)



(E)



6. The slope field for the differential equation $\frac{dy}{dx} = \frac{x^2 y + y^2}{4x + 2y}$ will have vertical segments when

(A) $y = 2x$, only

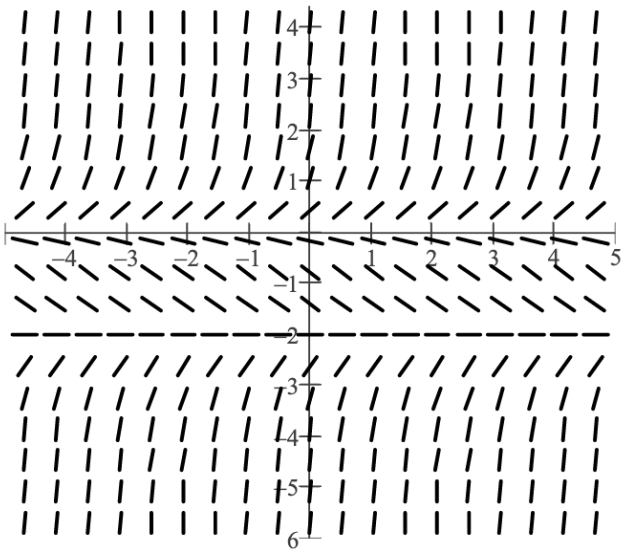
(B) $y = -2x$, only

(C) $y = -x^2$, only

(D) $y = 0$, only

(E) $y = 0$ or $y = -x^2$

7.



Which statement is true about the solutions $y(x)$, of a differential equation whose slope field is shown above?

I. If $y(0) > 0$ then $\lim_{x \to \infty} y(x) \approx 0$.

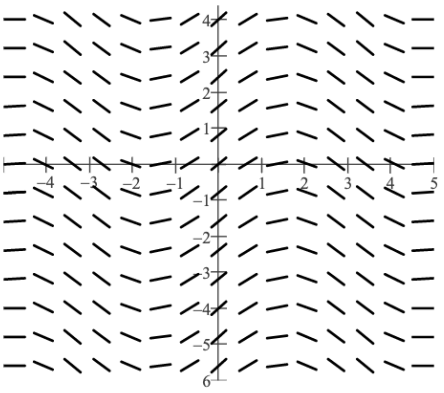
II. If $-2 < y(0) < 0$ then $\lim_{x \to \infty} y(x) \approx -2$.

III. If $y(0) < -2$ then $\lim_{x \to \infty} y(x) \approx -2$.

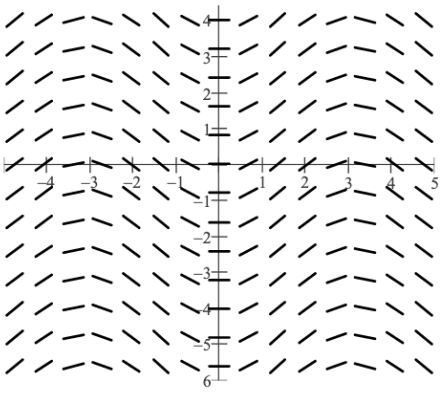
(A) I only (B) II only (C) III only (D) II and III only (E) I, II, and III

9. Which choice represents the slope field for $\frac{dy}{dx} = \cos x$?

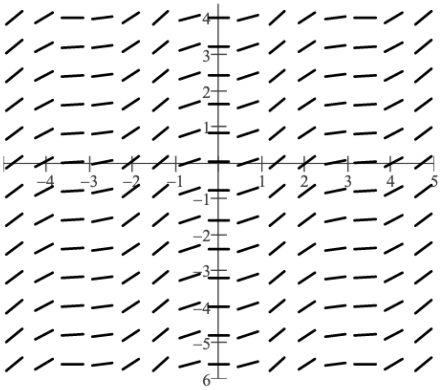
(A)



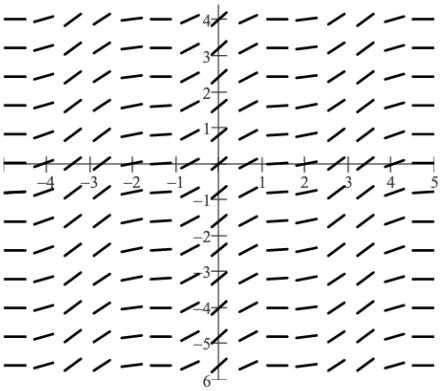
(B)



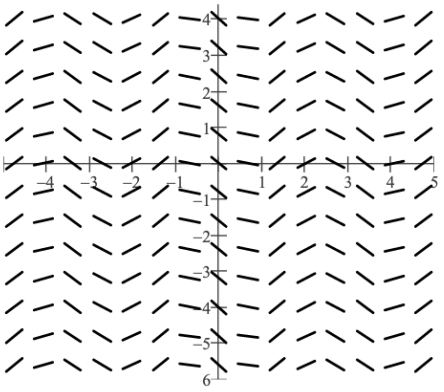
(C)



(D)



(E)



10.
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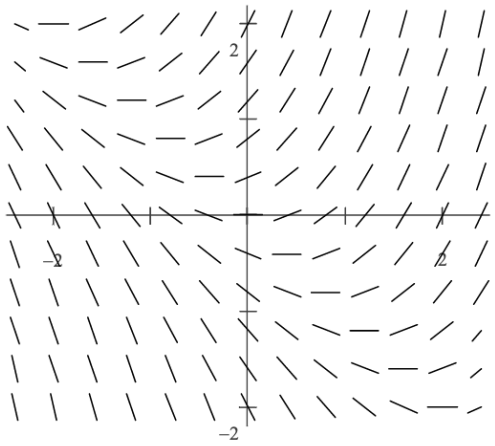

Shown above is the slope field for which of the following differential equations?

(A) $\frac{dy}{dx} = 1 + x$ (B) $\frac{dy}{dx} = x^2$ (C) $\frac{dy}{dx} = x + y$ (D) $\frac{dy}{dx} = \frac{x}{y}$ (E) $\frac{dy}{dx} = \ln y$