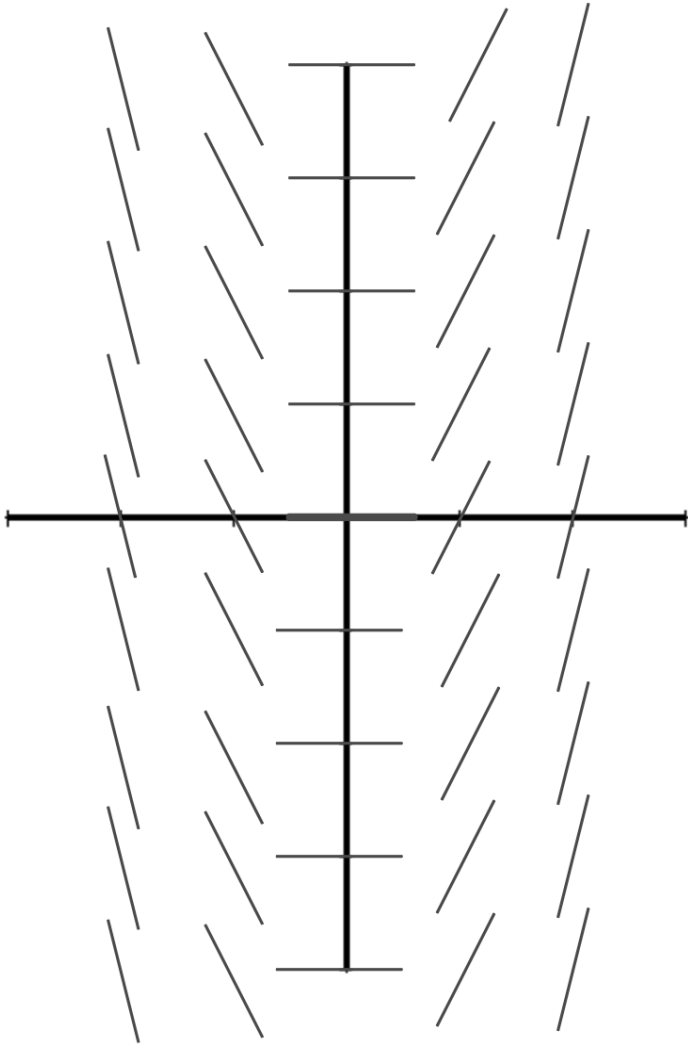

Initial value problems and differential equations can be illustrated with a slope field.

Slope fields are mostly used as a learning tool and are mostly done on a computer or graphing calculator, but a recent AP test asked students to draw a simple one by hand.

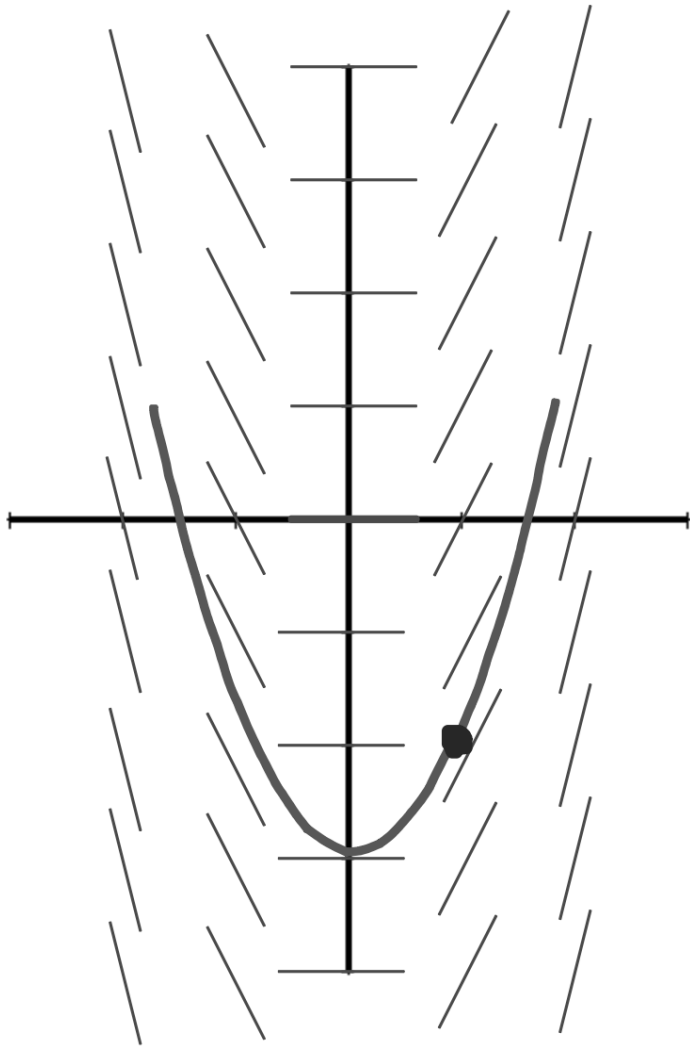




$$y' = 2x$$

x	y	y'
0	0	0
0	1	0
0	2	0
0	3	0
1	0	2
1	1	2
2	0	4
-1	0	-2
-2	0	-4

→



$$y' = 2x$$

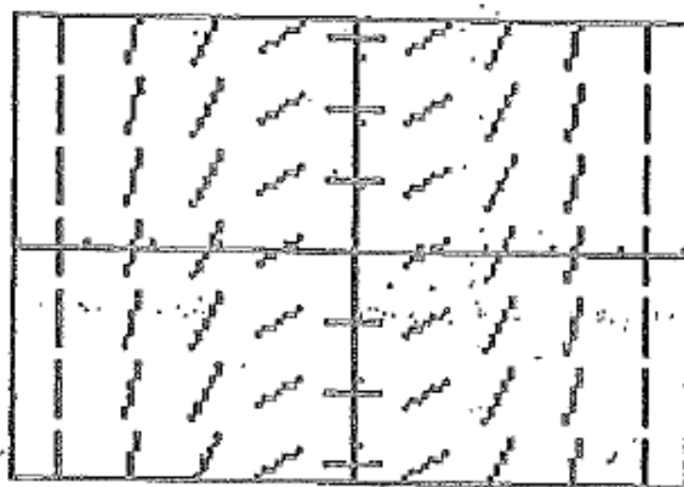
If you know an initial condition, such as $(1, -2)$, you can sketch the curve.

By following the slope field, you get a rough picture of what the curve looks like.

In this case, it is a parabola.



This here is a slope field for which equation?



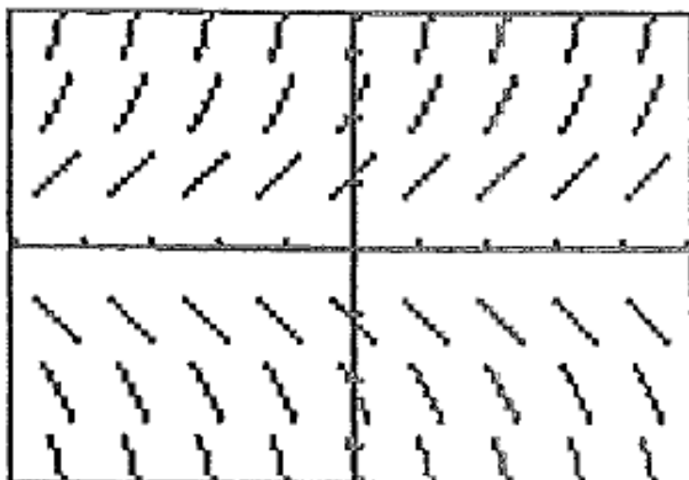
$y = \sin x$

$y = \frac{1}{x}$

$y = x^3$

$y = x^2$

This slope field matches which **DIFFERENTIAL** equation?

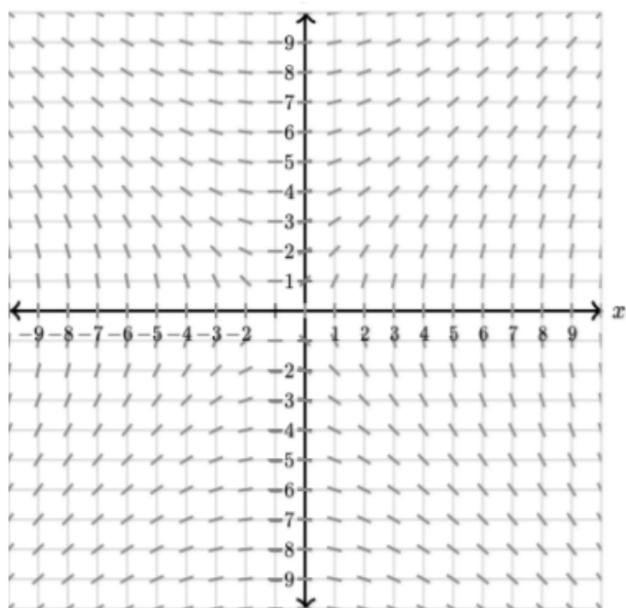


$$\frac{dy}{dx} = \frac{1}{2}x + 1$$

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

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

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



Choose 1 answer:

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

(B) $\frac{dy}{dx} = \frac{x}{y-1}$

(C) $\frac{dy}{dx} = \frac{x}{y+1}$

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

(E) $\frac{dy}{dx} = \frac{x+1}{y}$
