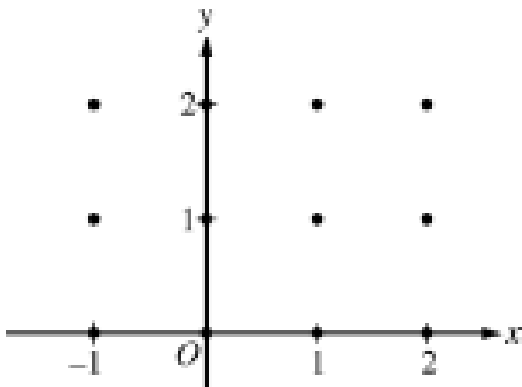


SLOPE FIELD PRACTICE: Free Response

4. Consider the differential equation  $\frac{dy}{dx} = 2x - y$ .

- a. On the axes provided, sketch a slope field for the given differential equation at the twelve points indicated, and sketch the solution curve that passes through the point  $(0, 1)$

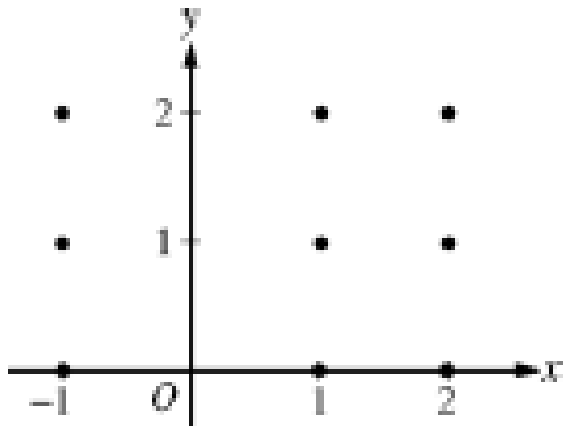


- b. Let  $y = f(x)$  be the particular solution to the given differential equation with the initial condition  $f(0) = 1$ . Use Euler's method, starting at  $x = 0$  with two steps of equal size, to approximate  $f(-.4)$ . Show the work that leads to your answer.

- c. Find  $\frac{d^2y}{dx^2}$  in terms of  $x$  and  $y$ . Determine whether the approximation found in part (b) is an overestimate or underestimate. Justify your answer.

5. Consider the differential equation  $\frac{dy}{dx} = \frac{y-1}{x^2}$ , where  $x \neq 0$ .

a) On the axis provided, sketch a slope field for the given differential equation at the nine points indicated.



b) Find the particular solution  $y = f(x)$  to the differential equation with the initial condition  $f(2) = 0$ .

c) For the particular solution  $y = f(x)$  described in part (b), find  $\lim_{x \rightarrow \infty} f(x)$ .