# What's the point w/ slope fields?

★ Solution to a diff. eq.

**Keyword:**

- slope field
- differential equation
  (eq'n w/ a derivative in it)
- solution
  (The eq'n w/out derivatives that fits the diff. eq'n.)
- initial value problem.

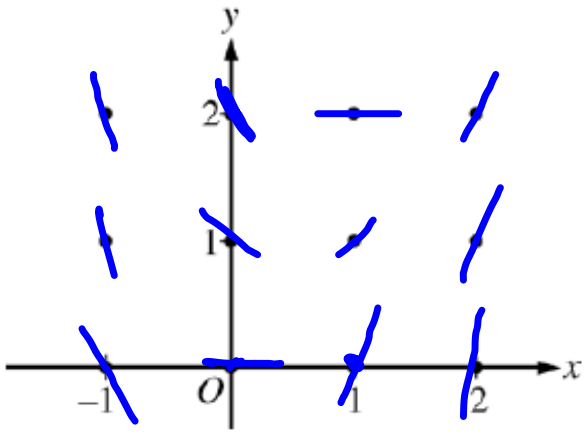
2005 BC

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 $(0, 1)$.

**(Note: Use the axes provided in the pink test booklet.)**

| point | slope |
|---|---|
| (0,0) | 0 |
| (1,0) | 2 |
| (2,0) | 4 |
| (-1,0) | -2 |



? #37

$\frac{d^3y}{dt^3} = \frac{1}{t^3}$ , $y(1)=1, y'(1)=3$

$y''(1)=2$

$\frac{d^2y}{dt^2} = t^{-3}$

$\frac{d^2y}{dt^2} = \frac{-1}{2}t^{-2} + C$

$2 = \frac{-1}{2}(1)^{-2} + C$

$C = 5/2$

$\frac{d^2y}{dt^2} = -\frac{1}{2}t^{-2} + 5/2$

$\frac{dy}{dt} = \frac{1}{2}t^{-1} + 5/2t + C$

$3 = \frac{1}{2}(1)^{-1} + 5/2(1) + C$

$3 = 3 + C$

$C = 0$

$\frac{dy}{dt} = \frac{1}{2}t^{-1} + 5/2t$

$\frac{1}{2} \cdot \frac{1}{t}$

$y = \frac{1}{2}\ln|t| + \frac{5}{4}t^2 + C$

$1 = \frac{1}{2}\ln 1 + \frac{5}{4}(1)^2 + C$

$1 = 0 + 5/4 + C$

$C = -1/4$

$y = \frac{1}{2}\ln|t| + \frac{5}{4}t^2 - 1/4$

The solution