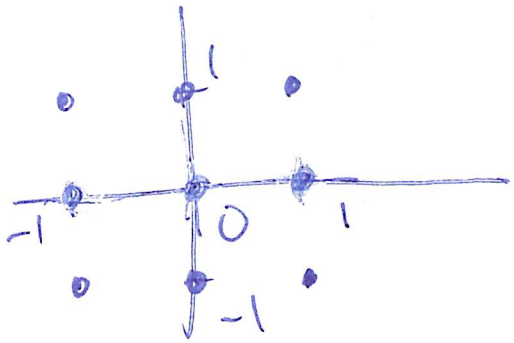
3-2 Obj:

to sketch slope fields of a differential equation.

Ex: Sketch the slope field of $\frac{dy}{dx} = x^2 y$ at the points indicated.



A slope field is literally a field of slopes. Just find the slopes ($\frac{dy}{dx}$) at the indicated pts by plugging in the (x,y) values.

$(0,0) = 0^2 \cdot 0 \Rightarrow m = 0$

$(0,1) = 0^2 \cdot 1 \Rightarrow m = 0$

$(0,-1) = 0^2 \cdot -1 \Rightarrow m = 0$

$(1,0) = 1^2 \cdot 0 \Rightarrow m = 0$

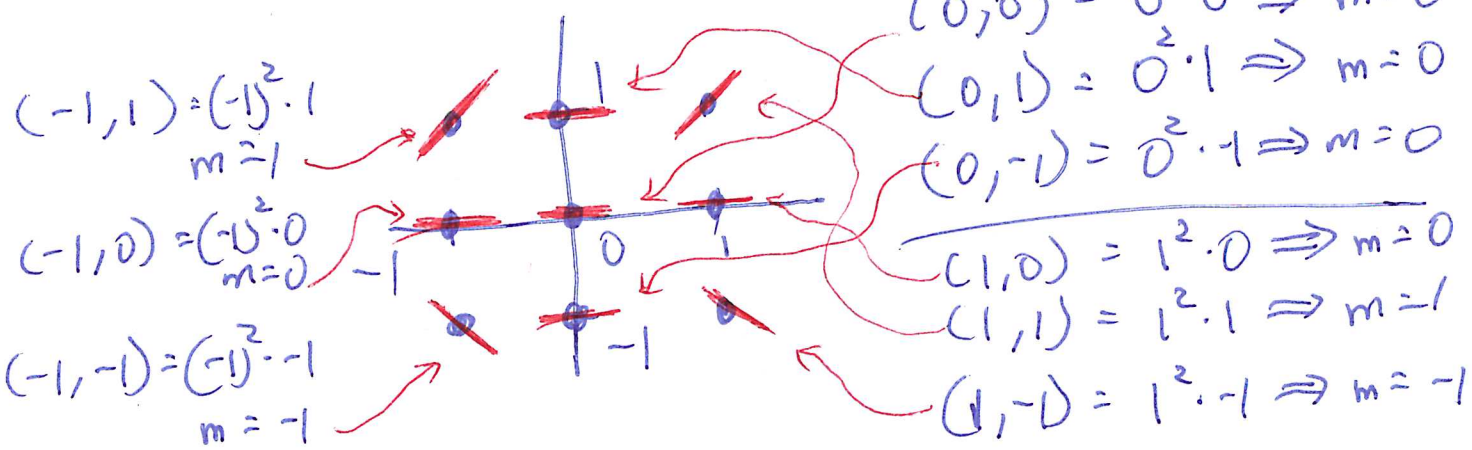
$(1,1) = 1^2 \cdot 1 \Rightarrow m = 1$

$(1,-1) = 1^2 \cdot -1 \Rightarrow m = -1$

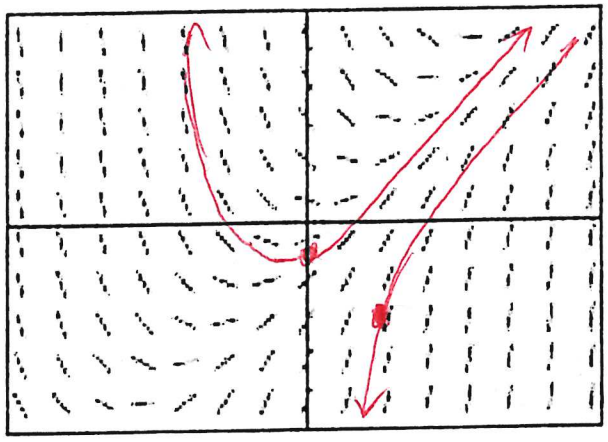
$(-1,1) = (-1)^2 \cdot 1$, $m = 1$

$(-1,0) = (-1)^2 \cdot 0$, $m = 0$

$(-1,-1) = (-1)^2 \cdot -1$, $m = -1$



* A slope field shows the General shape of the General Soln of a differential equation.



* For example, following the "flow" of the slopes, the particular solutions at (0,1) and (2,-3) are shown.

* Another way to think of it is...

If we solved the differential equation, found the general soln, & then the particular soln at (0,1), the graph of that particular soln would be the shape of the graph above through (0,-1).