

Q 1-1 i)

Stable focus at  $(0, 0)$

$$\dot{x} = -0.1x + y$$

$$\dot{y} = -x - 0.1y$$

Nullclines

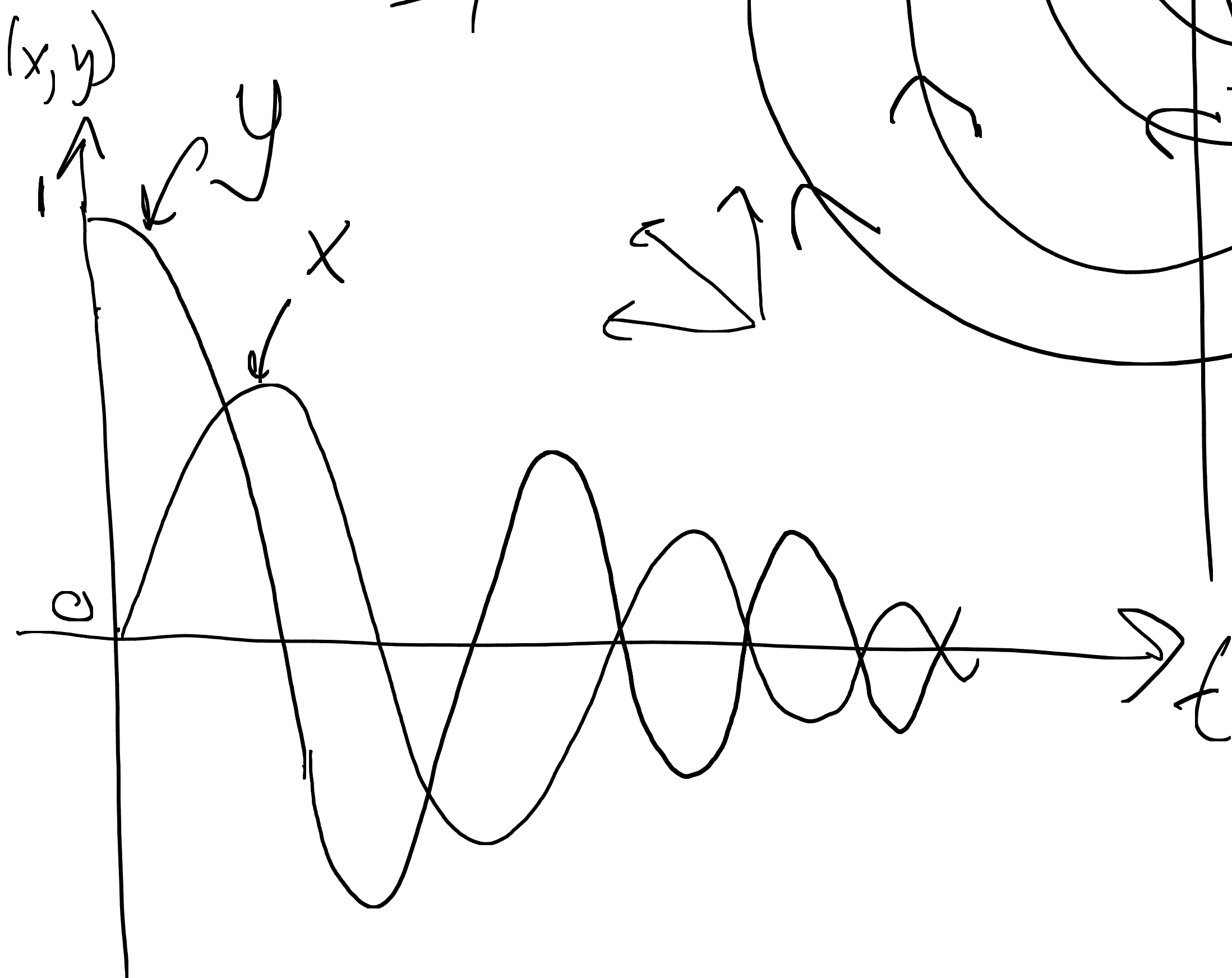
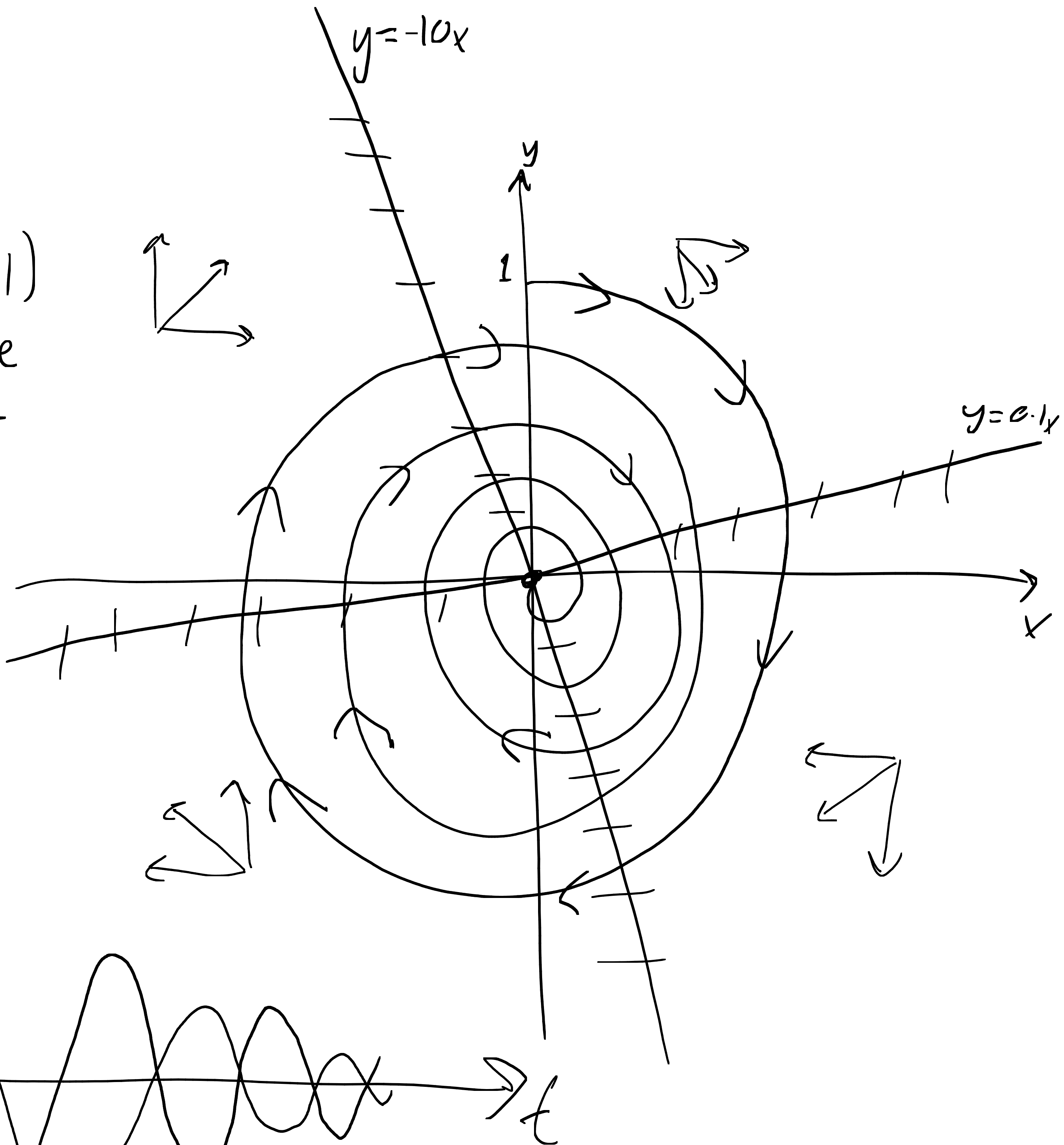
$$x: y = 0.1x$$

$$y: y = -10x$$

Check  $(0, 1)$

$$\dot{x}(0, 1) = +ve$$

$$\dot{y}(0, 1) = -ve$$



ii)  $\dot{x} = 0.1x + y$  Saddle point @ (0, 0)

$$\dot{y} = x - 0.1y$$

x-cline      y-cline

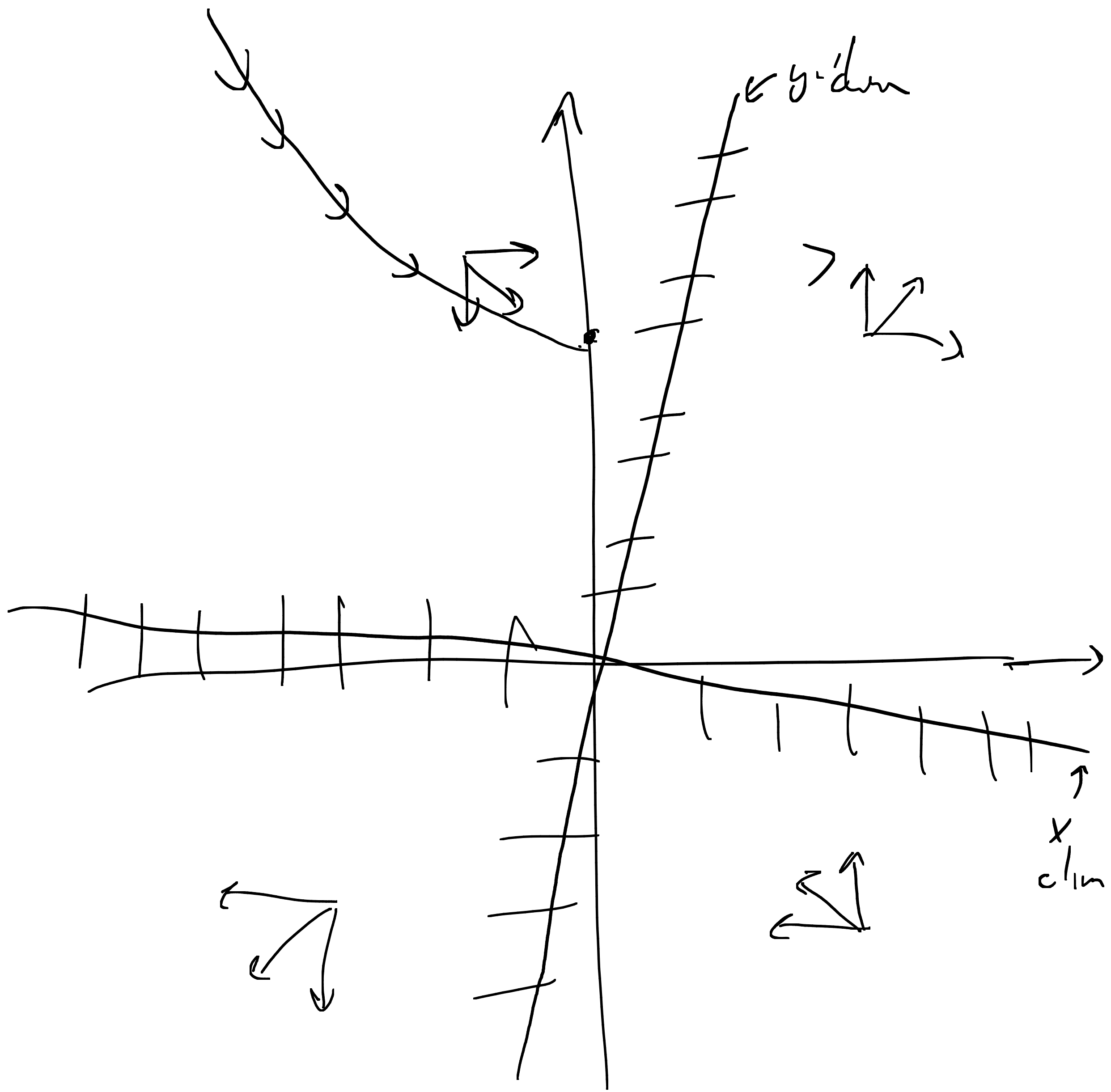
$$y = -0.1x$$

$$y = 10x$$

Check (0, 1)

$$\dot{x}(0, 1) = +ve$$

$$\dot{y}(0, 1) = -ve$$



(x, y)

