

6. (9 points) Consider the direction field plotted below.

(i) (3 points) Trace the solution curves passing through the points $(-2, 2)$, $(-2, 0)$, and $(-1, -1)$. (That is, we are looking for three distinct curves.)

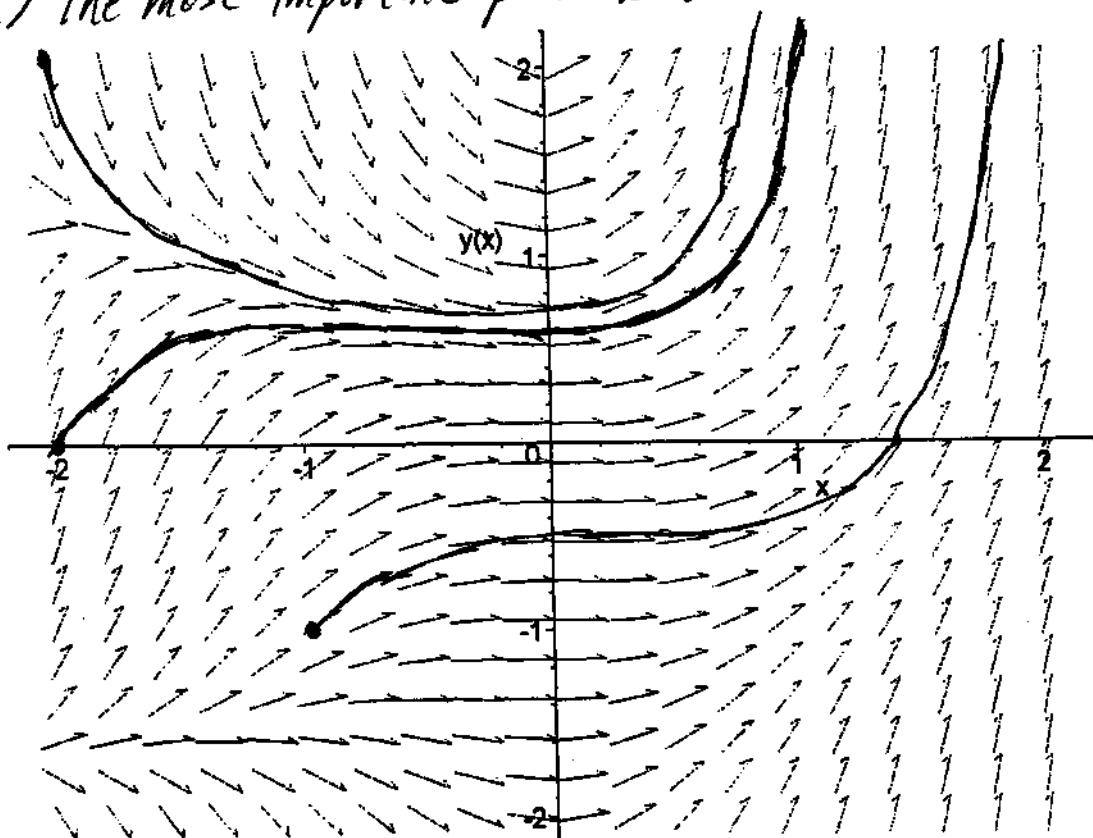
(ii) (6 points) Which of the following could be the differential equation producing the given direction field? Explain.

A. $\frac{dy}{dx} = ye^x + 1$

B. $\frac{dy}{dx} = y \sin x + xy^2 + x^2$

C. $\frac{dy}{dx} = x^2 + y^2$

(i) The most important point is that the lines cannot overlap.



(ii) Only B is possible. Test the slope of the point $(0, -2)$. The slope of the direction field here is about 0. A provides a slope of -1, B provides a slope of 0, and C provides a slope of 4. Test different points to confirm.