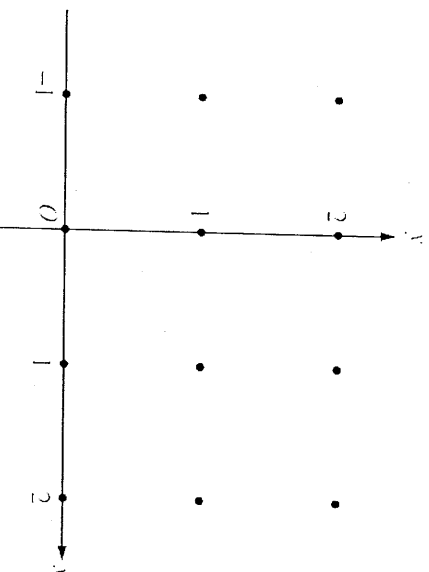


5. Consider the curve given by $y^2 = 2 + xy$.

- (a) Show that $\frac{dy}{dx} = \frac{y}{2y - x}$.
 - (b) Find all points (x, y) on the curve where the line tangent to the curve has slope $\frac{1}{2}$.
 - (c) Show that there are no points (x, y) on the curve where the line tangent to the curve is horizontal.
 - (d) Let x and y be functions of time t that are related by the equation $y^2 = 2 + xy$. At time $t = 5$, the value of y is 3 and $\frac{dy}{dt} = 6$. Find the value of $\frac{dx}{dt}$ at time $t = 5$.
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6. Consider the differential equation $\frac{dy}{dx} = \frac{-xy^2}{2}$. Let $y = f(x)$ be the particular solution to this differential equation with the initial condition $f(-1) = 2$.

- (a) On the axes provided, sketch a slope field for the given differential equation at the twelve points indicated. **(Note: Use the axes provided in the test booklet.)**



- (b) Write an equation for the line tangent to the graph of f at $x = -1$.
 - (c) Find the solution $y = f(x)$ to the given differential equation with the initial condition $f(-1) = 2$.
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