6. [6 points] Let $C$ be the curve implicitly defined by the equation $xy = y^2 + 2x$. Note that
\[
\frac{dy}{dx} = \frac{2 - y}{x - 2y}.
\]

a. [3 points] Find the coordinates of all points on the curve $C$ where the tangent line to $C$ is horizontal. If no such points exist, write DNE and show work to justify your answer.

Answer: 

b. [3 points] Find the coordinates of all points on the curve $C$ where the tangent line to $C$ is vertical. If no such points exist, write DNE and show work to justify your answer.

Answer: 

7. [5 points] The equation $\sin(x^3) + x^2y = 1 + y^2$ defines $y$ implicitly as a function of $x$.

Find a formula for $\frac{dy}{dx}$ in terms of $x$ and $y$. Show every step of your work.

Answer: $\frac{dy}{dx} =$