6. [6 points] Let $\mathcal{C}$ 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 $\mathcal{C}$ where the tangent line to $\mathcal{C}$ 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 $\mathcal{C}$ where the tangent line to $\mathcal{C}$ 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: $\frac{dy}{dx} =$ _____