Integral Calculus: Homework (due: January 23 before class)

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1 Implicit differentiation

The function $z = f(x, y)$ obeys:

$$f(x, y) + \sin(f(x, y)) = 2xy(x + 1)$$

1. Find $\dfrac{\partial f}{\partial x}(0, 0)$ **(2 points)**

2. Find $\dfrac{\partial^2 f}{\partial x \partial y}(0, 0)$ **(2 points)**

2 Analysing critical points

Use the second derivative test to classify the critical points of $f(x, y) = xy(x - 1)(y + 2)$. **(6 points)**