Problem Set #9

Due Friday, April 23, 2021 @ midnight
Submit as single pdf file to onCourse

Remember that you need to explain your answers and reference any tests or results used!

1. Let $f(x,y) = x\, e^{-\frac{x^2}{2} - \frac{y^3}{3} + y}$.

   Show that $(-1,-1)$, $(-1,1)$, $(1,-1)$, and $(1,1)$ are critical points of $f(x,y)$. That is, show both partial derivatives of f are zero at each of these points.

   In fact, these are the only critical points of $f(x,y)$.

2. Use a contour plot to classify each critical point in #1 as a local max, local min, or saddle point.

3. Find the points on the curves $y = x^2 - 6x + 10$ and $y = -x^2 - 10x - 27$ that are closest to each other.

   How far apart are they?

   Note: This problem will graded out of 6 points.