MTH 265, Quiz #13, Summer 2021        Name _____

**Instructions**: Show all work.  Use exact answers unless specifically asked to round. Be sure to complete all parts of each question.

1.  Find the critical points of the function $f(x,y) = x^2 - 3xy + 2y^2 + 4y$ and characterize each as a maximum, minimum or saddle point.

2.  Find the absolute extrema for the function $f(x,y) = x^2 - 2y^2$ on the region bounded by $y = 4 - x^2$ and $y = -5$.

3.  Find an appropriate change of variables for the region bounded by the sides of the rectangle with vertices (0,0), (3,4), (0,8), and (-3,4).  Calculate the value of the Jacobian, and use that information to find the value of the integral $\int_A \int (3x + 4y)^2 e^{4x+3y} dA$ over the indicated rectangle.