1. The point \((1,2)\) is a critical point of \(f(x,y) = (2x - x^2)(4y - y^2)\).
   Use the Second Derivative Test to classify \((1,2)\) as one of the following:
   a. Local Maximum
   b. Local Minimum
   c. Inflection Point
   d. Saddle Point
   e. Test Fails

2. Find the volume of the solid below the surface \(z = 2xy\) above the region between the curves \(y = x^2, \ y = 0\) and \(x = 2\).
   a. \(\frac{64}{3}\)
   b. \(\frac{32}{3}\)
   c. \(\frac{16}{3}\)
   d. \(\frac{8}{3}\)
   e. \(\frac{4}{3}\)
3. Reverse the order of integration in the integral \( \int_0^4 \int_0^y e^{x^2+y^2} \, dx \, dy \)

   a. \( \int_0^{16} \int_0^{x^2} e^{x^2+y^2} \, dy \, dx \)

   b. \( \int_0^2 \int_0^{x^4} e^{x^2+y^2} \, dy \, dx \)

   c. \( \int_0^2 \int_0^{x^2} e^{x^2+y^2} \, dy \, dx \)

   d. \( \int_0^2 \int_0^{x^4} e^{x^2+y^2} \, dy \, dx \)

   e. \( \int_0^2 \int_0^{x^2} e^{x^2+y^2} \, dy \, dx \)

4. (10 points) Find the mass and \( x \)-component of the center of mass of the plate in the first quadrant bounded by \( y = 3 - x \), the \( x \)-axis and the \( y \)-axis if the surface density is \( \rho = y \).

   Solve on the back of the Scantron.