234 Quiz 9

Section: Name:

20 minutes. The extra two points are bonus.

1. (a)(3) Mark true or false for the following (No need to explain):
   \[ \int_a^b f(x,y) \, dx \, dy = \int_c^d f(x,y) \, dy \, dx \]
   \[ \int_0^1 \int_{x^2}^x f(x,y) \, dy \, dx = \int_x^1 \int_0^1 f(x,y) \, dy \, dx \]
   \[ \int_0^{100} \int_0^{100} f(x) f(y) \, dx \, dy = \left( \int_0^{100} f(x) \, dx \right)^2 \]

(b)(4) Let \( D = \{(x,y) : 0 \leq y \leq 1, y^2 \leq x \leq 1\} \). Compute the volume under the graph of the function \( f(x,y) = y \sin(x^2) \) and above \( D \).

2. (5) Set up the integral in polar coordinates without solving:
   The volume under \( f(x,y) = x^2 \) and above the region \( D = \{(x,y) : x^2 + y^2 \geq 4, x^2 + (y-2)^2 \leq 4\} \)