Math 2263, Quiz 7
You must show all work for full credit, you have 15 min to finish it.

1.(7 pt) Evaluate the double integral: $\iint_D y^2 dA$ where D is the triangular region with vertices $(0,1),(1,2),(4,1)$.

Solution: We are going to integrate x first, then y. The left function is $x = y - 1$, the right function is $x = 7 - 3y$, and $y \in [1,2]$. So $\iint_D y^2 dA = \int_1^2 \int_{y-1}^{7-3y} y^2 dx dy = \int_1^2 8y^2 - 4y^3 dy = \frac{11}{3}$.

2.(8 pt) Evaluate the given integral by **changing to polar coordinates**: $\iint_D (x+y) dA$ where D is the region $\{(x,y) \mid x^2 + y^2 \leq 4, x \geq 0, y \geq 0\}$.

Solution: Let $x = r\cos(\theta), y = r\sin(\theta)$, then we know $r \in [0,2], \theta \in [0, \frac{\pi}{2}]$. Our integral $\iint_D (x+y) dA = \int_0^{\frac{\pi}{2}} \int_0^2 r(r\cos(\theta) + r\sin(\theta)) dr d\theta = \int_0^{\frac{\pi}{2}} \frac{8}{3}(\cos(\theta) + \sin(\theta)) d\theta = \frac{16}{3}$.