Use the paper provided. Put your name on the front of the first page and the back of the last page. Each problem is worth 10 points. NO CALCULATORS!

1. Compute $\int\!\!\!\!\int_D \left( \frac{x}{a} \right)^2 + \left( \frac{y}{b} \right)^2 \, dx \, dy$, where $D$ is the region inside 

$\left( \frac{x}{a} \right)^2 + \left( \frac{y}{b} \right)^2 = 1$.

2. Find the volume of the solid below $x^2 + y^2 + z^2 = 1$ and above $z = \sqrt{x^2 + y^2}$.

3. Compute $\int\!\!\!\!\int_D (x+y)^3 e^{x-y} \, dx \, dy$, where $D$ is the region bounded by $x+y = 1$, $x+y = 5$, $x-y = -1$, and $x-y = 2$.

4. Compute $\int\!\!\!\!\int_D e^{x^2+y^2} \, dx \, dy$, where $D$ is the region inside $x^2 + y^2 = 1$.

5. Let $D^*$ be the parallelogram with vertices at $(-1,3)$, $(0,0)$, $(2,-1)$, and $(1,2)$, let $D$ be the rectangle $D = [0,1] \times [0,1]$. Find a transformation $T$ such that $D$ is the image set of $D^*$ under $T$. 