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 $\displaystyle\iint_D \left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 \, dx\, dy$, where D is the region inside $(\frac{x}{a})^2 + (\frac{y}{b})^2 = 1$.

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

4. Compute $\displaystyle\iint_D e^{x^2+y^2} \, dx\, dy$, 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 .