

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. Parameterize the sphere with center $(0, 2, 0)$ and radius 5.
2. Find the equation of the plane tangent to $z = x^2 + y^2$ at $(1, 2, 5)$.
3. Find the area of the part of the surface $z = x^2 + y^2$ which has $x^2 + y^2 \leq 1$.
4. Compute $\iint_{\mathcal{S}} x \, dS$, where \mathcal{S} is the triangle with vertices $(1, 1, 0)$, $(0, 2, 0)$, and $(0, 0, 1)$.
5. Find $\iint_{\mathcal{S}} \vec{\mathbf{F}} \cdot d\vec{\mathbf{S}}$, where $\vec{\mathbf{F}}(x, y, z) = -2x \vec{\mathbf{i}} - 2y \vec{\mathbf{j}} - 2z \vec{\mathbf{k}}$ and \mathcal{S} is the surface $x^2 + y^2 + z^2 = 1$.