Use the paper provided. Each problem is worth 10 points.
NO CALCULATORS!

If you e-mail me requesting that I send you your grade, I will do it. Or, get your grade from VIP or TIPS.

1. Compute $\displaystyle\int_0^1 \int_{\tan^{-1} y}^{\frac{\pi}{4}} \sec^5 x\, dx\, dy$.

2. Compute $\displaystyle\int_0^1 \int_x^1 e^{-y^2}\, dy\, dx$.

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

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

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

5. 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 $x - y = 2$.

6. Compute $\displaystyle\iint_D e^{x^2+y^2}\, dx\, dy$, where D is the region inside $x^2 + y^2 = 1$.

7. Compute $\displaystyle\iint_{\mathcal{S}} x\, dS$, where $\mathcal{S}$ is the triangle with vertices $(1, 1, 0)$, $(0, 3, 0)$, and $(0, 0, 1)$.

8. Let $\overrightarrow{\boldsymbol{F}}(x, y, z) = (e^x \sin y)\,\overrightarrow{\boldsymbol{i}} + (e^x \cos y)\,\overrightarrow{\boldsymbol{j}} + z^2\,\overrightarrow{\boldsymbol{k}}$. Evaluate $\int_{\overrightarrow{\boldsymbol{c}}} \overrightarrow{\boldsymbol{F}} \cdot d\overrightarrow{\boldsymbol{s}}$, where $\overrightarrow{\boldsymbol{c}}(t) = (\sqrt{t}, t^3, e^{\sqrt{t}})$, for $0 \le t \le 1$.

9. Evaluate $\displaystyle\iint_S (\overrightarrow{\nabla} \times \overrightarrow{\boldsymbol{F}}) \cdot d\overrightarrow{\boldsymbol{S}}$ where S is the surface $x^2 + y^2 + 3z^2 = 1$, $z \le 0$, and $\overrightarrow{\boldsymbol{F}} = y\,\overrightarrow{\boldsymbol{i}} - x\,\overrightarrow{\boldsymbol{j}} + zx^3y^2\,\overrightarrow{\boldsymbol{k}}$.

10. Find $\displaystyle\int_{\boldsymbol{c}} (3y + x)\, dx + (8x - 15y) dy$, where $\boldsymbol{c}$ is the path that starts at $(1, 0)$; travels along the x -axis to $(2, 0)$; travels in the upper half plane along the circle with center $(0, 0)$ and radius 2 to $(-2, 0)$; travels along the x -axis to $(-1, 0)$; and travels in the upper half plane along the circle with center $(0, 0)$ and radius 1 back to $(1, 0)$.