Name: _____

Please show all work and justify your answers. Supply brief narration with your solutions and draw conclusions.

1. A solid is bounded by the coordinate planes and the plane $5x + 2y + z = 10$. Set up, but do not evaluate the iterated integral for the volume with the order of integration z, x, y.

2. Integrate $\omega = y \, dx + x \, dy$ along the segment of the curve $x^2 - y^5 = 0$ from $[-1, 1]$ to $[1, 1]$. Had we chosen a different path from $[-1, 1]$ to $[1, 1]$, would the integral remain the same? Explain.

3. Find first a parametric formula and then an equation for the plane in $\mathbf{R}^3$ tangent to the surface $[st, s + t, e^{st}]$ at $[0, 1, 1]$.

4. Parametrize the paraboloid $z = 1 - x^2 - y^2, z \geq 0$ oriented with the upward normal. Compute the flux of $\mathbf{F} = [x, y, z]$ through this surface. Would the flux of $\mathbf{F}$ through the unit disc differ? Explain.

5. Find a scalar potential on the plane for the conservative vector field $[5x^2 - y, 2y^3 - x]$.

1	2	3	4	5	total (50)	%

Prelim. course grade:　　　 %