Midterm 2 / 2003.11.26 / Calculus for Applications / MAT 3243

Name: ______________________________

Please show all work and justify your statements. Make and label sketches, draw conclusions (using complete sentences and including units), and box your final answers as appropriate.

1. Integrate $\omega = x\,dy$ along the segment of the curve $x^4 - y^3 = 0$ from $(-1, 1)$ to $(1, 1)$.
2. Find all ω on the plane such that $d\omega = (2x - 3y)\,dx + (4y - 3x)\,dy$.
3. Find an equation and a parametric formula for the plane tangent to the surface $[e^s, t^2 e^{2s}, 2e^{-s} + t]$ at $[1, 4, 0]$.
4. Find the flux of $\mathbf{F} = [x, 3y, 0]$ out of the cylinder $x^2 + y^2 = 4, -1 \leq z \leq 1$.
5. Compute the flux of the vector field $\mathbf{F} = [x + \cos(yz), e^{xz} + y, z - \sin(yx)]$ out of the unit sphere. Hint: to avoid major computations, use the divergence theorem.
6. Let $\omega = xy$ and $\eta = y\,dx + x\,dz$. Find and simplify $d\omega \wedge \eta$ and $d\omega \wedge d\eta$.

1	2	3	4	5	6	total (60)	%

Prelim. course grade: %