

Name: _____

Please show all work and box the answers.

1. (10 pts.) Let $F = xy\hat{j} + z\hat{k}$. Compute $\text{div } F$ and $\text{curl } F$.
2. (15 pts.) Compute $d\omega$
 - (a) $\omega = x^2e^{yz}$
 - (b) $\omega = -y dx + x dy$
 - (c) $\omega = x^2 dy dz + y^2 dz dx + z^2 dx dy$
3. (10 pts.) Find an equation for the plane tangent to the surface given by $ze^y \cos x = 1$ at the point $\pi\hat{i} - \hat{k}$.
4. (20 pts.) Evaluate the following integrals
 - (a) $\int_M x dx + y dy - z dz$, where M is the curve $\{t\hat{i} + 3t^2\hat{j} + 2t^3\hat{k}: -1 \leq t \leq 1\}$
 - (b) $\int_M x dy dz + y dz dx$, where M is the cylinder $x^2 + y^2 = 4$, $-1 \leq z \leq 1$
 - (c) $\int_M z dx dy dz$, where M is the dowel $x^2 + y^2 \leq 4$, $-1 \leq z \leq 1$
 - (d) Surface area: $\int_M |dS|$, where M is $\{s\hat{i} + (s+t)\hat{j} + t\hat{k}: 0 \leq s \leq 1, 0 \leq t \leq 2\}$

1	2	3	4	total (55)	%