

Name:

TAKE-HOME FINAL EXAM QUESTIONS
Due no later than Wednesday, 12/16/09 at 5:00 pm

MATH 3C (J. Cochrane)
(Sections 16.7, 16.8)

Please **show your work** to receive full credit. **CIRCLE** the answer to each part.

1. Let σ be the portion of the paraboloid $z = 4 - x^2 - y^2$ for which $z \geq 0$, with boundary curve C , positively oriented. Assume upward orientation for σ . Let

$\mathbf{F}(x, y, z) = \langle z - y, x - z, y - x \rangle$. Use Stokes' Theorem and an appropriate surface

integral to calculate $\int_C \mathbf{F} \cdot \mathbf{T} ds$.

2. Use the Divergence Theorem to calculate the flux of $\mathbf{F}(x, y, z) = \langle e^x, -ye^x, 4x^2z \rangle$ across σ , the surface of the solid enclosed by $x^2 + y^2 = 4$ and the planes $z = 0$ and $z = 9$. Assume outward orientation for σ .