WebAssign
Hw 37 (16.9): Divergence Theorem (Homework)

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MA 261 Fall 2012, section 121, Fall 2012
Instructor: David Daniels

Current Score : 20 / 20 **Due :** Tuesday, December 4 2012 11:00 PM EST

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1. 4/4 points | Previous Answers SCalcET7 16.9.002.

Verify that the Divergence Theorem is true for the vector field **F** on the region E. Give the flux.

$\mathbf{F}(x, y, z) = x^2\mathbf{i} + xy\mathbf{j} + z\mathbf{k}$,
E is the solid bounded by the paraboloid $z = 4 - x^2 - y^2$ and the xy-plane.

✓

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2. 4/4 points | Previous Answers SCalcET7 16.9.005.

Use the Divergence Theorem to calculate the surface integral $\iint_S \mathbf{F} \cdot d\mathbf{S}$; that is, calculate the flux of **F** across S.

$\mathbf{F}(x, y, z) = xye^z\mathbf{i} + xy^2z^3\mathbf{j} - ye^z\mathbf{k}$,
S is the surface of the box bounded by the coordinate plane and the planes $x = 5$, $y = 4$, and $z = 1$.

✓

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3. 4/4 points | Previous Answers SCalcET7 16.9.007.MI.

Use the Divergence Theorem to calculate the surface integral $\iint_S \mathbf{F} \cdot d\mathbf{S}$; that is, calculate the flux of **F** across S.

$\mathbf{F}(x, y, z) = 3xy^2\mathbf{i} + xe^z\mathbf{j} + z^3\mathbf{k}$,
S is the surface of the solid bounded by the cylinder $y^2 + z^2 = 1$ and the planes $x = -3$ and $x = 3$.

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4. 4/4 points | Previous Answers SCalcET7 16.9.011.

Use the Divergence Theorem to calculate the surface integral $\iint_S \mathbf{F} \cdot d\mathbf{S}$; that is, calculate the flux of **F** across S.

$\mathbf{F}(x, y, z) = (\cos z + xy^2)\ \mathbf{i} + xe^{-z}\ \mathbf{j} + (\sin y + x^2z)\ \mathbf{k}$,
S is the surface of the solid bounded by the paraboloid $z = x^2 + y^2$ and the plane $z = 9$.

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5. 4/4 points | Previous Answers SCalcET7 16.9.012.

Use the Divergence Theorem to calculate the surface integral $\iint_S \mathbf{F} \cdot d\mathbf{S}$; that is, calculate the flux of **F** across S.

$\mathbf{F}(x, y, z) = x^4\mathbf{i} - x^3z^2\mathbf{j} + 4xy^2z\mathbf{k}$,
S is the surface of the solid bounded by the cylinder $x^2 + y^2 = 9$ and the planes $z = x + 8$ and $z = 0$.

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