1. **(1 point)** Library/WHFreeman/Rogawski_Calculus_Early_Transcendentals_Second_Edition/17_Fundamental_Theorems_of_Vector_Analysis/17.2_Stokes_Theorem/17.2.13.pg

Let I be the flux of $\mathbf{G} = \left\langle 5e^y, 7x^6e^{x^7}, 0\right\rangle$ through the upper hemisphere $\mathcal{S}$ of the unit sphere.

(a) Find a vector field $\mathbf{A}$ such that $\mathrm{curl}(\mathbf{A}) = \mathbf{G}$.
(b) Calculate the circulation of $\mathbf{A}$ around $\partial\mathcal{S}$.
(c) Compute I, the flux of $\mathbf{G}$ through $\mathcal{S}$.

(a) $\mathbf{A} =$ ______
(b) $\int_C \mathbf{A}\cdot d\mathbf{s} =$ ______
(c) $I =$ ______

2. **(1 point)** Library/WHFreeman/Rogawski_Calculus_Early_Transcendentals_Second_Edition/17_Fundamental_Theorems_of_Vector_Analysis/17.2_Stokes_Theorem/17.2.7.pg

Verify Stokes' Theorem for the given vector field and surface, oriented with an upward-pointing normal:
$\mathbf{F} = \langle e^{y-z}, 0, 0\rangle$, the square with vertices $(8,0,3)$, $(8,8,3)$, $(0,8,3)$, and $(0,0,3)$.
$\int_C \mathbf{F}\cdot d\mathbf{s} =$ ______
$\iint_S \mathrm{curl}(\mathbf{F})\cdot d\mathbf{S} =$ ______

3. **(1 point)** Library/WHFreeman/Rogawski_Calculus_Early_Transcendentals_Second_Edition/17_Fundamental_Theorems_of_Vector_Analysis/17.3_Divergence_Theorem/17.3.9.pg

Verify the Divergence Theorem for the vector field and region:
$\mathbf{F} = \langle 6x, 8z, 5y\rangle$ and the region $x^2+y^2 \le 1$, $0 \le z \le 3$
$\iint_S \mathbf{F}\cdot d\mathbf{S} =$ ______
$\iiint_{\mathcal{R}} \mathrm{div}(\mathbf{F})\, dV =$ ______

4. **(1 point)** Library/WHFreeman/Rogawski_Calculus_Early_Transcendentals_Second_Edition/17_Fundamental_Theorems_of_Vector_Analysis/17.3_Divergence_Theorem/17.3.13.pg

Use the Divergence Theorem to evaluate the surface integral $\iint_S \mathbf{F}\cdot d\mathbf{S}$.
$\mathbf{F} = \left\langle x^3, 1, z^3\right\rangle$, $\mathcal{S}$ is the sphere $x^2+y^2+z^2 = 16$.

$\iint_S \mathbf{F}\cdot d\mathbf{S} =$ ______

5. **(1 point)** Library/Rochester/setVectorCalculus3/ur_vc_13_7.pg

Use Stokes' theorem to evaluate $\displaystyle\iint_S (\nabla\times\mathbf{F})\cdot d\mathbf{S}$ where $\mathbf{F}(x,y,z) = -14yz\mathbf{i} + 14xz\mathbf{j} + 1(x^2+y^2)z\mathbf{k}$ and S is the part of the paraboloid $z = x^2+y^2$ that lies inside the cylinder $x^2+y^2 = 1$, oriented upward.

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6. **(1 point)** Library/./Dartmouth/setMTWCh7S2/problem_1.pg

Let $\mathbf{F} = (2x, 2y, 2x+2z)$.

Use Stokes' theorem to evaluate the integral of $\mathbf{F}$ around the curve consisting of the straight lines joining the points (1,0,1), (0,1,0) and (0,0,1).

In particular, compute the unit normal vector and the curl of $\mathbf{F}$ as well as the value of the integral:

$\mathbf{n} =$ (____,____,____) (the unit normal vector)
$\nabla\times\mathbf{F} =$ (____,____,____)
The value of the integral is ______.

7. **(1 point)** Library/Rochester/setVectorCalculus3/ur_vc_13_9.pg

Use the divergence theorem to find the outward flux of the vector field $\mathbf{F}(x,y,z) = 3x^2\mathbf{i} + 4y^2\mathbf{j} + 5z^2\mathbf{k}$ across the boundary of the rectangular prism: $0 \le x \le 3, 0 \le y \le 3, 0 \le z \le 2$.

______

8. **(1 point)** Library/./Dartmouth/setMTWCh7S3/problem_1.pg

Evaluate $\iint_{\partial W} \mathbf{F}\cdot d\mathbf{S}$ where $\mathbf{F} = (x^2+y, z^2, e^y - z)$ and W is the solid rectangular box whose sides are bounded by the coordinate planes, and the planes $x = 7,\ y = 6,\ z = 6$.

______

9. **(1 point)** Library/Rochester/setVectorCalculus3/ur_vc_13_5.pg

Use Gauss's law to find the charge enclosed by the cube with vertices $(\pm1, \pm1, \pm1)$ if the electric field is $\mathbf{E}(x,y,z) = 1x\mathbf{i} + 4y\mathbf{j} + 1z\mathbf{k}$.

______ ε_0

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