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HW9 M282 S08 (377778)

About this Assignment

Due: **Tue Jun 3 2008 08:00 PDT**

1. SCalcET5 16.7.006. [349614] Show Details

Evaluate the surface integral.

$$\int\int_S xy\ dS$$

S is the triangular region with vertices (1,0,0), (0,2,0), and (0,0,2)

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2. SCalcET5 16.7.010. [349698] Show Details

Evaluate the surface integral.

$$\int\int_S y^2 + z^2\ dS$$

S is part of the paraboloid $x = 4 - y^2 - z^2$ that lies in front of the plane $x = 0$

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3. SCalcET5 16.7.012. [349657] Show Details

Evaluate the surface integral.

$$\int\int_S xy\ dS$$

S is the boundary of the region enclosed by the cylinder $x^2 + z^2 = 1$ and the planes $y = 0$ and $x + y = 2$

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4. SCalcET5 16.7.014. [349607] Show Details

Evaluate the surface integral.

$$\int\int_S xyz\ dS$$

S is the part of the sphere $x^2 + y^2 + z^2 = 1$ that lies above the cone $z = \sqrt{x^2 + y^2}$

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5. SCalcET5 16.7.022. [349635] Show Details

Evaluate the surface integral $\iint_S \mathbf{F}\cdot d\mathbf{S}$ for the given vector field $\mathbf{F}$ and the oriented surface S. In other words, find the flux of $\mathbf{F}$ across S. Use the positive (outward) orientation.

$\mathbf{F}(x,y,z) = x\,\mathbf{i} + y\,\mathbf{j} + z^4\,\mathbf{k}$
S is the part of the cone $z = \sqrt{x^2 + y^2}$ beneath the plane $z = 1$ with downward orientation

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6. SCalcET5 16.7.024. [349706] Show Details

Evaluate the surface integral $\iint_S \mathbf{F}\cdot d\mathbf{S}$ for the given vector field $\mathbf{F}$ and the oriented surface S. In other words, find the flux of $\mathbf{F}$ across S. Use the positive (outward) orientation.

$\mathbf{F}(x,y,z) = -y\,\mathbf{i} + x\,\mathbf{j} + 3z\,\mathbf{k}$
S is the hemisphere $z = \sqrt{16 - x^2 - y^2}$ with upward orientation

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7. SCalcET5 16.7.044. [349640] Show Details

The temperature at a point in a ball with conductivity K is inversely proportional to the distance from the center of the ball. Find the rate of heat flow across a sphere S of radius a with center at the center of the ball.

Kc

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8. HW9.1 [549429] Show Details

Let R be the sphere $x^2 + y^2 + z^2 \leq 1$ and let F(x,y,z)=(2x,2y,2z).

Find the boundary Flux integral in Gauss's Theorem for this example (A numerical answer xx.xx is desired)

Find the interior divergence integral in Gauss's Theorem for this example (A

numerical answer xx.xx is desired)

9. HW9.2 [549431] Show Details

Let S be the hemi-sphere $x^2+y^2+z^2=9$ for $z \geq 0$ and let F(x,y,z)=(-y,x,0).

Find the boundary line integral in Stoke's Theorem for this example. Use the upward normal. (A numerical answer xx.xx is desired)

Find the interior curl-Flux integral in Stoke's Theorem for this example. Use the upward normal. (A numerical answer xx.xx is desired)

10. HW9.3 [549484] Show Details

D be the ball of radius 2 about the origin, let $P=\frac{x}{(x^2+y^2+z^2)^{\frac{3}{2}}}$, $Q=\frac{y}{(x^2+y^2+z^2)^{\frac{3}{2}}}$, and let $R=\frac{z}{(x^2+y^2+z^2)^{\frac{3}{2}}}$. Let F(x,y,z)=(P,Q,R).

Find the boundary Flux integral in Gauss's Theorem for this example (A numerical answer xx.xx is desired)

Find the interior divergence integral in Gauss's Theorem for this example (A numerical answer xx.xx is desired)

11. HW9.4 [549486] Show Details

Let S be the hemi-sphere $x^2+y^2+z^2=9$ for $z \geq 0$, let $P=-\frac{y}{x^2+y^2}$, let $Q=\frac{x}{x^2+y^2}$,

and let F=(P,Q,0).

Find the boundary line integral in Stoke's Theorem for this example. Use the upward normal. (A numerical answer x.xxx is desired)

Find the interior curl-Flux integral in Stoke's Theorem for this example. Use the upward normal. (A numerical answer x.xxx is desired)

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12. HW9.5 [550301] Show Details

Let B be the ball $x^2 + y^2 + z^2 \leq 1$ and let F(x,y,z)=(x^3,0,0).

Find the boundary Flux integral in Gauss's Theorem for this example. (A numerical answer x.xx is desired)

Find the interior divergence integral in Gauss's Theorem for this example.(A numerical answer x.xx is desired)

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13. HW9.6 [550303] Show Details

Let S be the surface $x^2 + y^2 + z^2 = 9$ for $1 \leq z \leq 2$. Let F(x,y,z)=(0,x,0). Use the upward normal

Find the boundary line integral in Stoke's Theorem for this example. (A numerical answer x.xx is desired)

Find the interior Flux integral in Stoke's Theorem for this example. (A numerical answer x.xx is desired)

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