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About this Assignment

Due: **Tue May 20 2008 08:00 PDT****1.** SCalcET5 16.4.008. [349609] [Show Details](#)

Use Green's Theorem to evaluate the line integral along the given positively oriented curve where C is the triangle with vertices $(0,0)$, $(1,3)$, and $(0,3)$.

$$\int_C x^2 y^2 dx + 4xy^3 dy$$

2. SCalcET5 16.4.018. [349680] [Show Details](#)

A particle starts at the point $(-2,0)$, moves along the x -axis to $(2,0)$, and then along the semicircle below to the starting point.

$$y = \sqrt{4 - x^2}$$

Use Green's Theorem to find the work done on this particle by the force field $\mathbf{F}(x,y) = [x, x^3 + 3xy^2]$.

3. SCalcET5 16.5.003. [349704] [Show Details](#)

You are given the following.

$$\mathbf{F}(x,y,z) = (x - 2z) \mathbf{i} + (x + y + z) \mathbf{j} + (x - 2y) \mathbf{k}$$

(a) Find the curl.

$$\text{[]} \mathbf{i} + \text{[]} \mathbf{j} + \text{[]} \mathbf{k}$$

(b) Find the divergence of the vector field.

4. SCalcET5 16.5.006. [349601] [Show Details](#)

You are given the following.

$$\mathbf{F}(x,y,z) = \frac{x}{x^2 + y^2 + z^2} \mathbf{i} + \frac{y}{x^2 + y^2 + z^2} \mathbf{j} + \frac{z}{x^2 + y^2 + z^2} \mathbf{k}$$

(a) Find the curl.

\mathbf{i} + \mathbf{j} + \mathbf{k}

(b) Find the divergence of the vector field.



 symbolic formatting help


5. SCalcET5 16.5.016. [349650] [Show Details](#)

Determine whether or not the vector field is conservative. If it is conservative, find a function f such that $\mathbf{F} = \nabla f$. If it is not conservative, enter 0.

$$\mathbf{F}(x,y,z) = xy^2z^3 \mathbf{i} + 2x^2yz^3 \mathbf{j} + 3x^2y^2z^2 \mathbf{k}$$

- Yes, it is conservative.
 No, it is not conservative.

$f(x,y,z) =$  + K

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6. HW7.1 [540755] [Show Details](#)

Let R be the region which is bounded by the interval $[0,2]$ on the x axis and by the curve $x(t) = t + t^4$ and $y(t) = t - t^7$ for t in $[0,1]$. Using an appropriate "sneaky trick", find the area of R .



(A numerical answer .xxxx is desired)

7. HW7.3 [545259] [Show Details](#)

Consider Puffin's not so favorite vector field: $\frac{-2(y+1)dx + 2(x-1)dy}{(x-1)^2 + (y+1)^2}$. All curves are to be traversed counterclockwise. Compute:

$\int_{x^4+y^4=1} \frac{-2(y+1)dx + 2(x-1)dy}{(x-1)^2 + (y+1)^2}$ (A numerical answer x.xxx is desired)

$\int_{x^4+y^4=11} \frac{-2(y+1)dx + 2(x-1)dy}{(x-1)^2 + (y+1)^2}$ (A numerical answer x.xxx is desired)

$\int_{x^4+y^4=21} \frac{-2(y+1)dx + 2(x-1)dy}{(x-1)^2 + (y+1)^2}$ (A numerical answer x.xxx is desired)

$\int_{x^4+y^4=31} \frac{-2(y+1)dx + 2(x-1)dy}{(x-1)^2 + (y+1)^2}$ (A numerical answer x.xxx is desired)



8. HW7.2 [540321] [Show Details](#)

Consider Puffin's favorite vector field: $\frac{-ydx + xdy}{x^2 + y^2}$. All curves are to be traversed counterclockwise. Compute:

$\int_{(x-2)^4+(y-1)^4=1} \frac{-ydx + xdy}{x^2 + y^2}$ (A numerical answer x.xxx is desired)

$\int_{(x-2)^4+(y-1)^4=11} \frac{-ydx + xdy}{x^2 + y^2}$ (A numerical answer x.xxx is desired)

$\int_{(x-2)^4+(y-1)^4=21} \frac{-ydx + xdy}{x^2 + y^2}$ (A numerical answer x.xxx is desired)

$\int_{(x-2)^4+(y-1)^4=31} \frac{-ydx + xdy}{x^2 + y^2}$ (A numerical answer x.xxx is desired)



9. HW7.4 [545260] [Show Details](#)

Let $F(x,y)=(2x+3y, 3x+4y)$ and let γ be the upper part of the circle of radius $\sqrt{5}$ about the point (2,0) which runs from the point (1,2) to (3,2). Apply the Fundamental Theorem of Calculus to find $\int_{\gamma} F\gamma' dt$



(A numerical answer xx.xx is desired)

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