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HW6 M282 S08 (377775)

About this Assignment

Due: **Tue May 13 2008 08:00 PDT**

1. SCalcET5 16.2.002. [349676] Show Details

Evaluate the line integral, where C is the given curve.

$$\int_C \frac{y}{x} ds \ , \ C : x = t^4, y = t^3, \frac{1}{2} \le t \le 1$$

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2. SCalcET5 16.2.010. [349701] Show Details

Evaluate the line integral, where C is the given curve.

$$\int_C x^2 z \ ds$$, C is the line segment from (0,6,-1) to (4,1,5)

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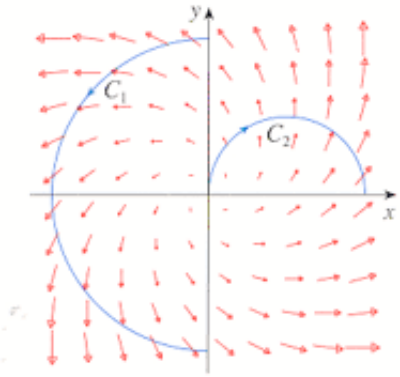
3. SCalcET5 16.2.018. [349594] Show Details

The figure shows a vector field **F** and two curves C_1 and C_2. Are the line integrals of **F** over C_1 and C_2 positive, negative, or zero?



F over C_1

- positive
- negative
- zero

F over C_2

- positive
- negative
- zero

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4. SCalcET5 16.2.020. [349611] Show Details

Evaluate the line integral $\int_C \mathbf{F}\cdot d\mathbf{r}$, where C is given by the vector function $\mathbf{r}(t)$.

$\mathbf{F}(x,y,,z) = yz\,\mathbf{i} + xz\,\mathbf{j} + xy\,\mathbf{k}$,
$\mathbf{r}(t) = t\,\mathbf{i} + t^2\,\mathbf{j} + t^3\,\mathbf{k}$,
$0 \le t \le 5$

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5. SCalcET5 16.2.032. [349654] Show Details

Find the mass and center of mass of a thin wire in the shape of a quarter-circle $x^2 + y^2 = r^2$, $x \ge 0$, $y \ge 0$, if the density function is $\rho(x,y) = x + y$.

$\bar{x}$ =

$\bar{y}$ =

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6. SCalcET5 16.3.002. [349712] Show Details

A table of values of a function f with continuous gradient is given. Find $\int_C \nabla f\cdot d\mathbf{r}$, where C has parametric equations $x = t^2 + 1$, $y = t^3 + t$, $0 \le t \le 1$.

$x\backslash y$	0	1	2
0	3	8	6
1	5	7	9

2	10	4	11

7. SCalcET5 16.3.004. [349624] Show Details

Determine whether or not **F** is a conservative vector field. If it is, find a function f such that **F** = ∇f. (If not, enter 0.)

$$\mathbf{F}(x,y) = (x^3 + 4xy)\mathbf{i} + (5x + 4y)\mathbf{j}$$

- yes, **F** is a conservative vector field
- no, **F** is not a conservative vector field

$f(x,y)$ = + K

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8. SCalcET5 16.3.006. [349710] Show Details

Determine whether or not **F** is a conservative vector field. If it is, find a function f such that **F** = ∇f. (If not, enter 0.)

$$\mathbf{F}(x,y) = e^y\,\mathbf{i} + xe^y\,\mathbf{j}$$

- yes, **F** is a conservative vector field
- no, **F** is not a conservative vector field

$f(x,y)$ = + K

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9. SCalcET5 16.3.008. [349699] Show Details

Determine whether or not **F** is a conservative vector field. If it is, find a function f such that **F** = ∇f. (If not, enter 0.)

$$\mathbf{F}(x,y) = (1 + 2xy + \ln x)\mathbf{i} + x^2\,\mathbf{j}$$

- yes, **F** is a conservative vector field
- no, **F** is not a conservative vector field

$f(x,y)$ = + K

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10. was SCalcET5 16.3.010. [349592] Show Details

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

$$\mathbf{F}(x,y) = (ye^{xy} + 4x^3y)\mathbf{i} + (xe^{xy} + x^4)\mathbf{j}$$

- yes, **F** is a conservative vector field
- no, **F** is not a conservative vector field

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

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11. SCalcET5 16.3.014. [349636] Show Details

You are given the following.

$$\mathbf{F}(x,y) = e^{2y}\,\mathbf{i} + (1 + 2xe^{2y})\mathbf{j}$$

C: $\mathbf{r}(t) = te^{t}\,\mathbf{i} + (1 + t)\mathbf{j}$, $0 \le t \le 1$

(a) Find a function f such that $\mathbf{F} = \nabla f$ (taking $K = 0$).

$f(x,y) =$ _____

(b) Use part (a) to evaluate $\int_C \mathbf{F}\cdot d\mathbf{r}$ along the curve C.

_____

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12. SCalcET5 16.3.016. [349613] Show Details

You are given the following.

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

C: $x = t^2$, $y = t + 1$, $z = 2t - 1$, $0 \le t \le 1$

(a) Find a function f such that $\mathbf{F} = \nabla f$ (taking $K = 0$).

$f(x,y,z) =$ _____

(b) Use part (a) to evaluate $\int_C \mathbf{F}\cdot d\mathbf{r}$ along the curve C, where C is defined by $x = t^2$, $y = t + 1$, $z = 2t - 1$, $0 \le t \le 1$.

_____

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13. HW6.1 [544871] Show Details

Let *F=(y,0)*. Determine $\int_\gamma F\gamma' dt = \int_\gamma y dx$ where

[ ] γ is the straight line from (1,2) to (2,4). A numerical answer x.xx is desired.

[ ] γ is the quarter circle about the origin from (1,0) to (0,1). A numerical answer x.xx is desired.

[ ] γ is the parabola $y = x^2$ from (0,0) to (2,4). A numerical answer x.xx is desired.

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14. HW6.2 [544873] Show Details

A thin wire is bent into the shape of a quarter circle $x^2 + y^2 = 9$ for $x < 0, y < 0$. Assume the linear density is 1. Find

[ ] The total mass of the wire. (A numerical answer x.xx is desired)

[ ] The x coordinate of the center of mass.(A numerical answer x.xx is desired)

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15. HW6.3 [544875] Show Details

Puffin is looking at a thin wire γ given by $x(t) = 2t^2, y(t) = t^4$ for $0 \le t \le 1$. The mass density is $\rho(x, y) = x$

[ ] Find the total mass of the wire. (A numerical answer x.xx is desired)

[ ] Evaluate the line integral $\int_\gamma 2ydx + x^2 dy$ (A numerical answer x.xx is desired)

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16. HW6.4 [544878] Show Details

Let $f = \cos(xy)\, e^{x \sin\ y} + x$. Let $F = grad(f)$. Find the work done in moving a particle along the curve γ where $x = \sin\ t$ and $y = \cos\ t$ for t between 0 and $\frac{\pi}{2}$.

(A numerical answer x.xx is desired)

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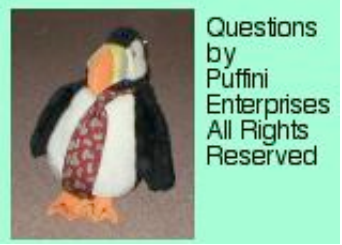
17. HW6-Replacement-GRONK [653256] Show Details

A wire has the shape of the helix $x = t$, $y = \cos t$, $z = \sin t$, $0 \leq t \leq 2\pi$. Assume that the density at any point is equal to the square of the distance from the origin. Please find:

a) The total Mass (An answer xxx.xx is desired)

(b) The y coordinate of the center of mass $\bar{y}$ = (An answer x.xxx is desired)



(This problem is a replacement for one that web assign gave the wrong answer for).

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