WebAssign
Hw 28 (16.2): Line Integrals (Homework)

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

Current Score : 20 / 20 **Due :** Thursday, November 1 2012 11:00 PM EDT

1. 4/4 points | Previous Answers SCalcET7 16.2.019.MI.

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

$\mathbf{F}(x, y) = xy\,\mathbf{i} + 9y^2\,\mathbf{j}$

$\mathbf{r}(t) = 16t^6\,\mathbf{i} + t^4\,\mathbf{j}, \quad 0 \le t \le 1$

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2. 4/4 points | Previous Answers SCalcET7 16.2.020.

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

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

$\mathbf{r}(t) = t^2\,\mathbf{i} + t^3\,\mathbf{j} + t^2\,\mathbf{k}, \quad 0 \le t \le 1$

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3. 4/4 points | Previous Answers SCalcET7 16.2.029.

Consider the functions below.

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

$\mathbf{r}(t) = t^4\,\mathbf{i} + t^5\,\mathbf{j}$

(a) Evaluate the line integral $\int_C \mathbf{F} \cdot d\mathbf{r}$, where C is given by $\mathbf{r}(t)$, $0 \le t \le 1$.

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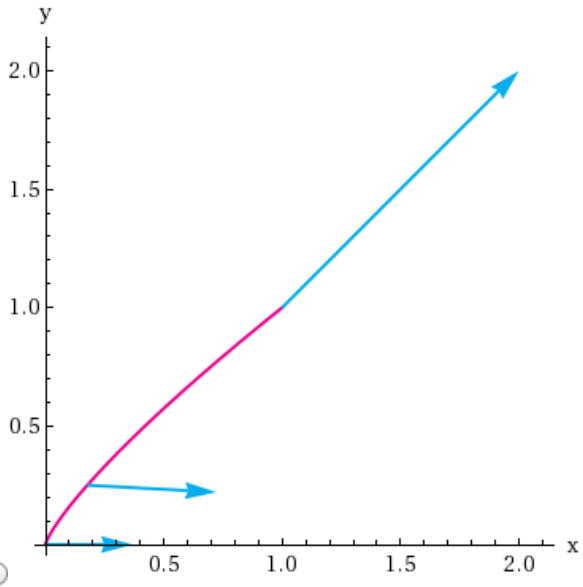
(b) Illustrate part (a) by using a graphing calculator or computer to graph C and the vectors from the vector field corresponding to $t = 0, 1/\sqrt{2}$, and 1.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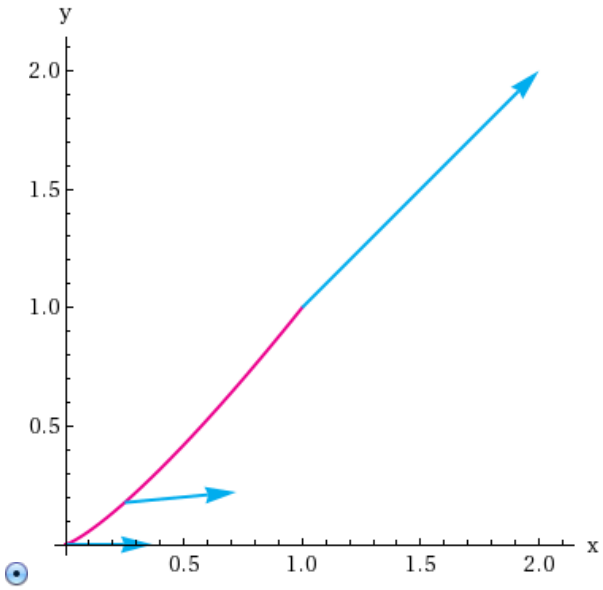
x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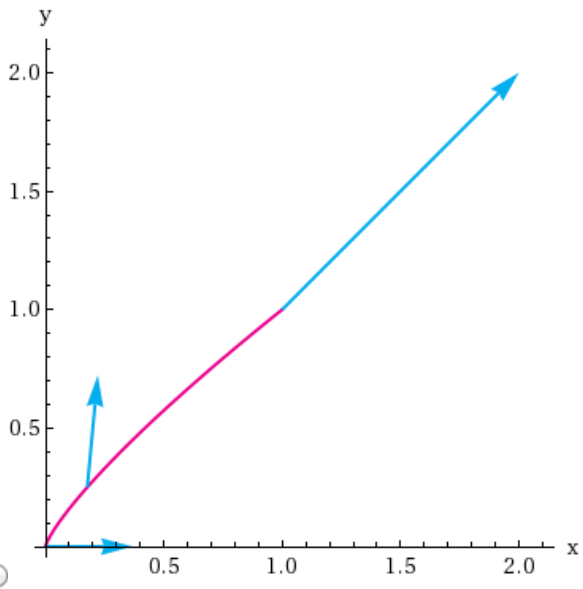
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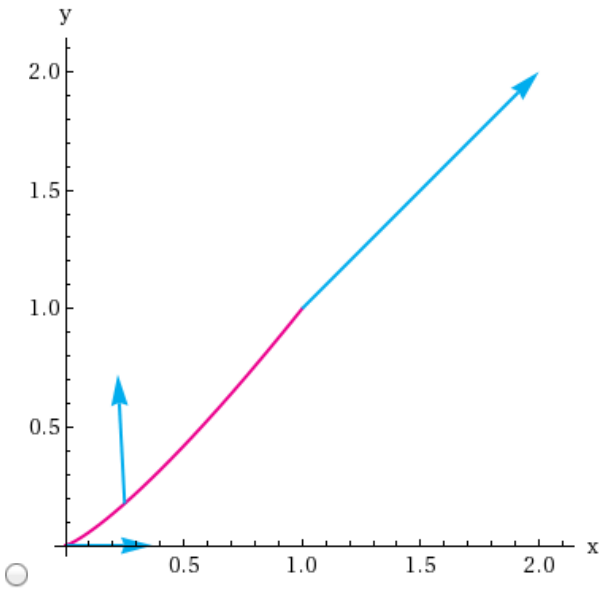
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4. 4/4 points | Previous Answers SCalcET7 16.2.032.

Consider the force field and circle defined below.

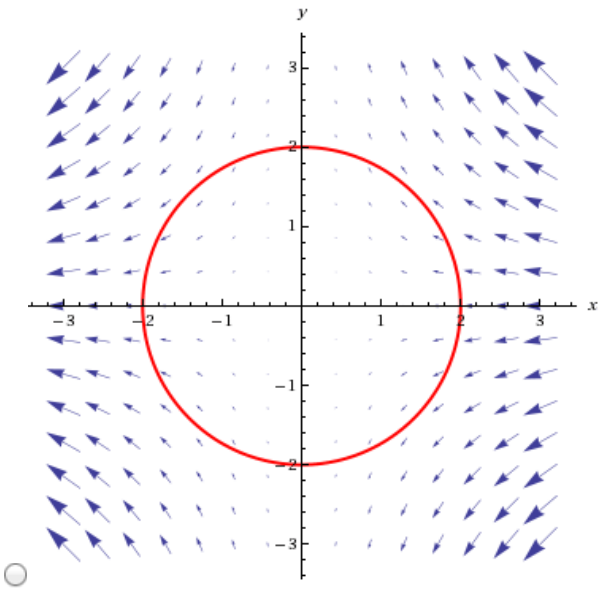
$\mathbf{F}(x, y) = x^2\,\mathbf{i} + xy\,\mathbf{j}$

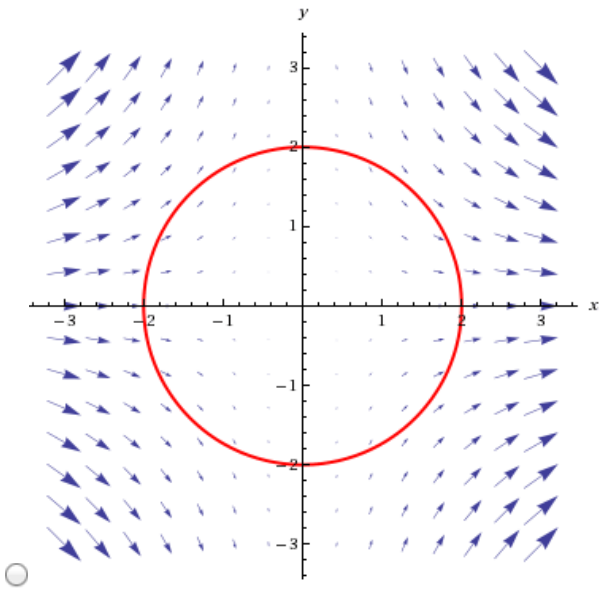
$x^2 + y^2 = 4$

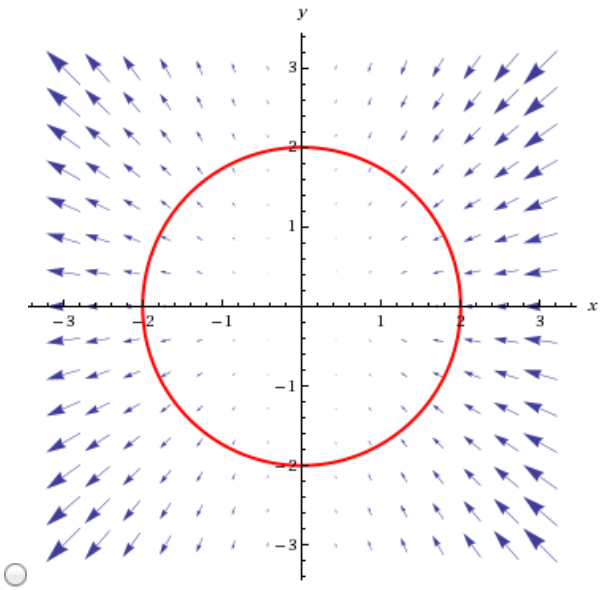
(a) Find the work done by the force field on a particle that moves once around the circle oriented in the clockwise direction.

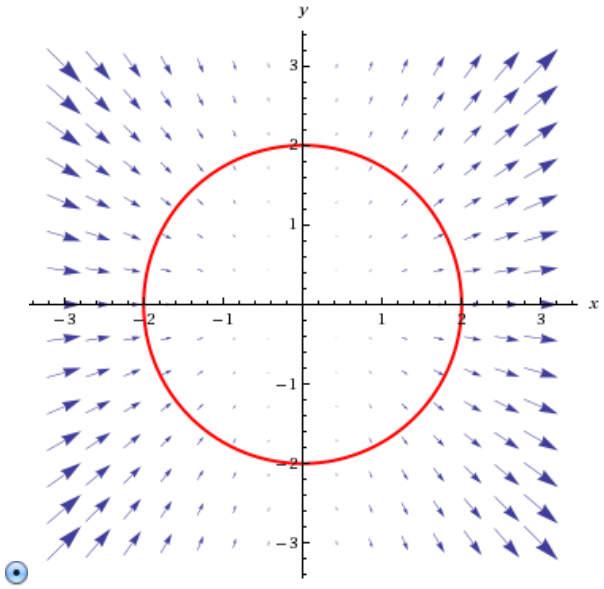
0

(b) Use a computer algebra system to graph the force field and circle on the same screen.









Use the graph to explain your answer to part (a).

- The amount of work done is negative because the vectors go against the path.
- The amount of work done is positive because the vectors go in the direction of the path.
- (•) There is no work done because the vectors are perpendicular to the path. ✔

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5. 4/4 points | Previous Answers SCalcET7 16.2.041.

Find the work done by the force field $\mathbf{F}(x, y, z) = \langle x - y^2, y - z^2, z - x^2 \rangle$ on a particle that moves along the line segment from (0, 0, 1) to (2, 1, 0).

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