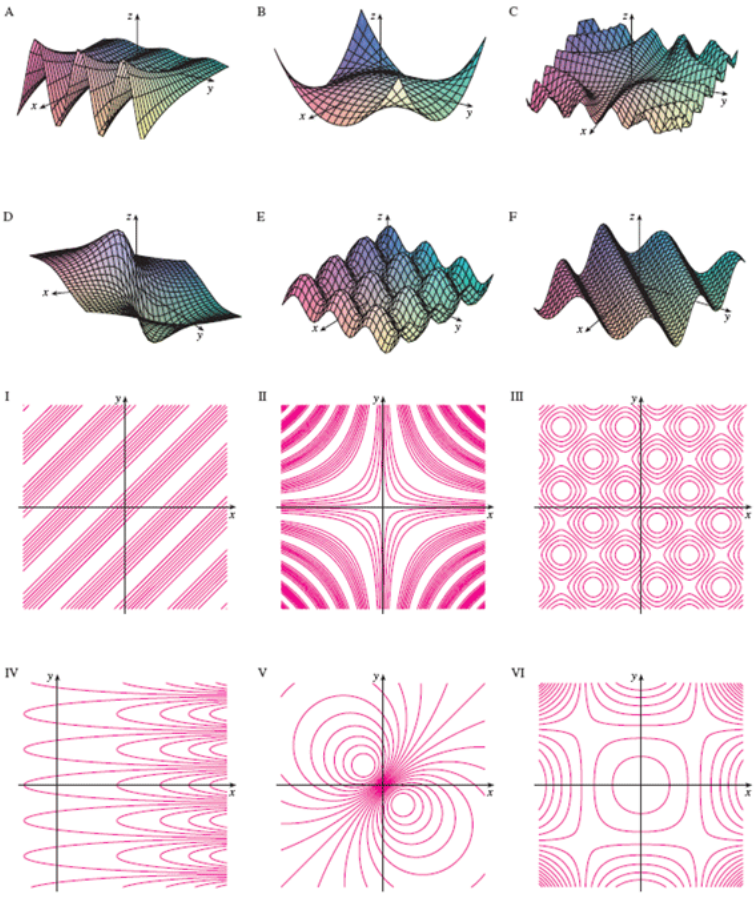
1. **[7/7 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 14.1.065.**

MY NOTES ASK YOUR TEACHER

Consider the function below.

$z = (1 - x^2)(1 - y^2)$



(a) Match the function with its graph (labeled A-F).

- A
- (B) B
- C
- D
- E
- F

(b) Match the function with its contour map (labeled I-VI).

- I
- II
- III
- IV
- V
- (VI) VI

Give reasons for your choices.

This function is zero ✔ along the lines $x = \pm 1$ and $y = \pm 1$. The only contour map in which this could occur is VI ✔. Also

$z =$ $$(1−x2)

note that the trace in the xz-plane is the parabola ✔ and the trace in the yz-plane is the parabola

$z =$ $$(1−y2)

✔, so the graph is B ✔.

Need Help? Read It Watch It

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2. [3/3 Points] DETAILS PREVIOUS ANSWERS SCALCET9M 16.5.021.MI.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Is there a vector field **G** on $\mathbb{R}^3$ such that curl **G** $= \langle x \sin(y), \cos(y), z - 3xy \rangle$?

- ○ Yes
- ◉ No ✔

Explain.

There is no ✔ such **G** because div(curl **G**) ≠ ✔ 0.

Need Help? Read It Watch It Master It

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3. [2/2 Points] DETAILS PREVIOUS ANSWERS SCALCET9M 14.8.011.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

This extreme value problem has a solution with both a maximum value and a minimum value. Use Lagrange multipliers to find the extreme values of the function subject to the given constraint.

$f(x, y, z) = xy^2z; \quad x^2 + y^2 + z^2 = 4$

$$2

maximum value

✔

$$−2

minimum value

✔

Need Help? Read It

4. **[3/3 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 14.6.039.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Suppose that over a certain region of space the electrical potential V is given by the following equation.

$V(x, y, z) = 2x^2 - 3xy + xyz$

(a) Find the rate of change of the potential at $P(3, 6, 5)$ in the direction of the vector $\mathbf{v} = \mathbf{i} + \mathbf{j} - \mathbf{k}$.

$$12\sqrt{3}$$

(b) In which direction does V change most rapidly at P?

$$(4,1,3)$$

(c) What is the maximum rate of change at P?

$$6\sqrt{26}$$

Need Help? Read It Watch It

5. **[2/2 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 16.3.022.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Consider $\mathbf{F}$ and C below.

$\mathbf{F}(x, y, z) = (y^2z + 2xz^2)\mathbf{i} + 2xyz\mathbf{j} + (xy^2 + 2x^2z)\mathbf{k}$,
C: $x = \sqrt{t}$, $y = t + 1$, $z = t^2$, $0 \le t \le 1$

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

$f(x, y, z) =$

$$xy2z+x2z2$$

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

5

Need Help? Read It

6. **[–/1 Points]** DETAILS **SCALCET9M 15.1.054.**

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

Find the average value of f over the given rectangle.

$$f(x, y) = 3e^y\sqrt{x + e^y}, \quad R = [0, 4] \times [0, 1]$$

f_{ave} = (No Response)

Need Help? Read It

7. **[3/3 Points]** DETAILS | PREVIOUS ANSWERS **SCALCET9M 14.7.013.**

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

Find the local maximum and minimum values and saddle point(s) of the function. If you have three-dimensional graphing software, graph the function with a domain and viewpoint that reveal all the important aspects of the function. (Enter your answers as a comma-separated list. If an answer does not exist, enter DNE.)

$$f(x, y) = x^3 - 3x + 3xy^2$$

$$2

local maximum value(s)

✔

$$-2

local minimum value(s)

✔

$$(0,1,0),(0,-1,0)

saddle point(s) (x, y, f) =

✔

Need Help? Read It

8. **[3/3 Points]** DETAILS PREVIOUS ANSWERS SCALCET9M 16.4.025.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

(a) If C is the line segment connecting the point (x_1, y_1) to the point (x_2, y_2), find the following.

$$\int_C x\,dy - y\,dx$$

$$x1y2-y1x2$$

(b) If the vertices of a polygon, in counterclockwise order, are $(x_1, y_1), (x_2, y_2), \ldots, (x_n, y_n)$, find the area of the polygon.

- $A = \frac{1}{2}\left[(x_1y_2 + x_2y_1) + (x_2y_3 + x_3y_2) + \cdots + (x_{n-1}y_n + x_ny_{n-1}) + (x_ny_1 + x_1y_n)\right]$
- $A = \frac{1}{2}\left[(x_2y_1 - x_1y_2) + (x_3y_2 - x_2y_3) + \cdots + (x_ny_{n-1} - x_{n-1}y_n) + (x_1y_n - x_ny_1)\right]$
- $A = \frac{1}{2}\left[(x_1y_2 - x_2y_1) + (x_2y_3 - x_3y_2) + \cdots + (x_{n-1}y_n - x_ny_{n-1}) + (x_ny_1 - x_1y_n)\right]$
- $A = \frac{1}{2}\left[(x_1y_2 - x_2y_1) - (x_2y_3 - x_3y_2) - \cdots - (x_{n-1}y_n - x_ny_{n-1}) + (x_ny_1 - x_1y_n)\right]$
- $A = (x_1y_2 - x_2y_1) + (x_2y_3 - x_3y_2) + \cdots + (x_{n-1}y_n - x_ny_{n-1}) + (x_ny_1 - x_1y_n)$

(c) Find the area of the pentagon with vertices (0, 0), (2, 1), (1, 3), (0, 1), and (−3, 1).

9/2

Need Help? Read It Watch It

9. **[1/1 Points]** DETAILS PREVIOUS ANSWERS SCALCET9M 14.3.078.

MY NOTES ASK YOUR TEACHER

Determine whether each of the following functions is a solution of Laplace's equation $u_{xx} + u_{yy} = 0$. (Select all that apply.)

- [x] $u = e^{-x}\cos(y) - e^{-y}\cos(x)$
- [x] $u = \ln\left(\sqrt{x^2 + y^2}\right)$
- [x] $u = \sin(x)\cosh(y) + \cos(x)\sinh(y)$
- [ ] $u = x^3 + 3xy^2$
- [ ] $u = x^2 + y^2$
- [x] $u = x^2 - y^2$

Need Help? Read It

10. [2/2 Points] DETAILS PREVIOUS ANSWERS SCALCET9M 16.5.003.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Consider the given vector field.

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

(a) Find the curl of the vector field.

curl **F** =

$$zexi+(2xyez−yzex)j−2xezk

(b) Find the divergence of the vector field.

div **F** =

$$2yez+yex

Need Help? Read It Watch It

11. [–/1 Points] DETAILS SCALCET9M 15.2.037.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find the volume of the given solid.

Bounded by the cylinders $z = 2x^2$, $y = x^2$ and the planes $z = 0$, $y = 4$

(No Response)

Need Help? Read It Watch It

12. **[2/2 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 16.2.031.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Consider the functions below.

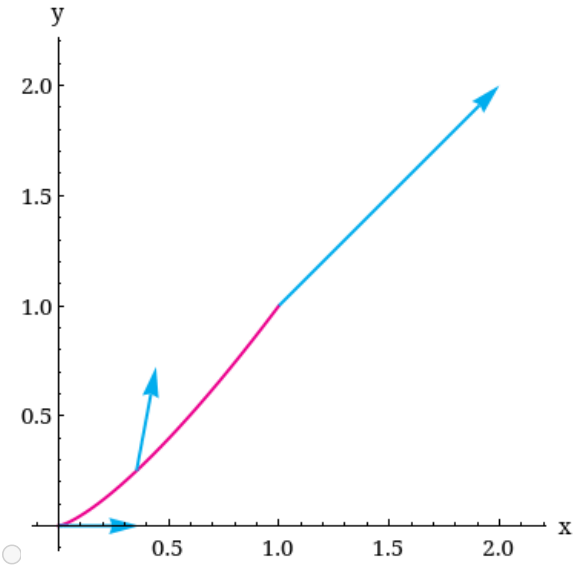
$\mathbf{F}(x, y) = e^{x-1}\,\mathbf{i} + xy\,\mathbf{j}$

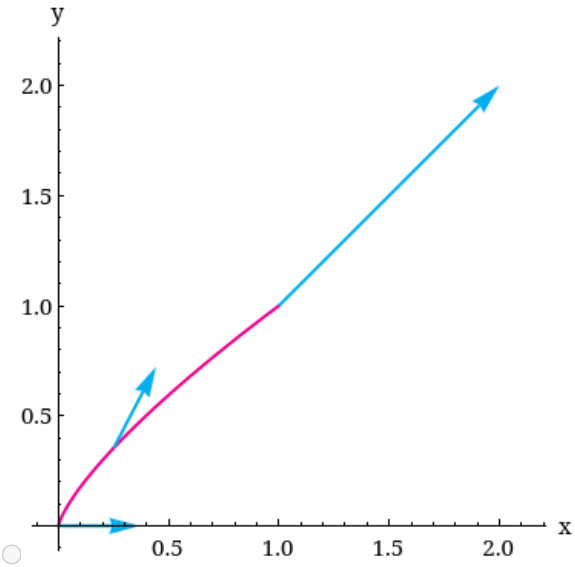
$\mathbf{r}(t) = t^4\,\mathbf{i} + t^3\,\mathbf{j}$

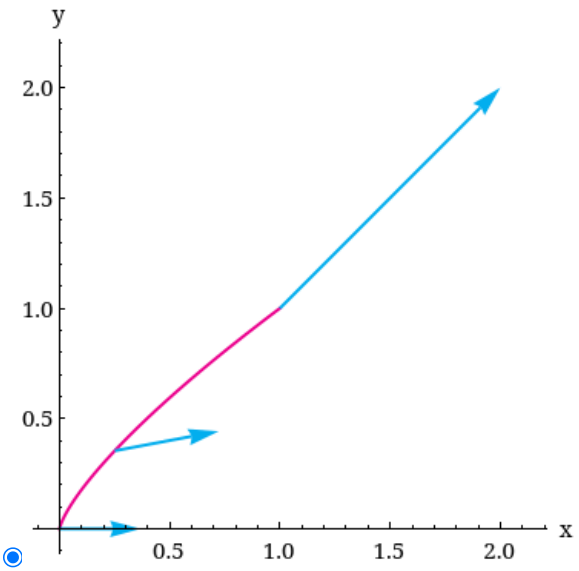
(a) Evaluate the line integral $\int_C \mathbf{F} \cdot d\mathbf{r}$, where C is given by $\mathbf{r}(t)$, $0 \le t \le 1$.

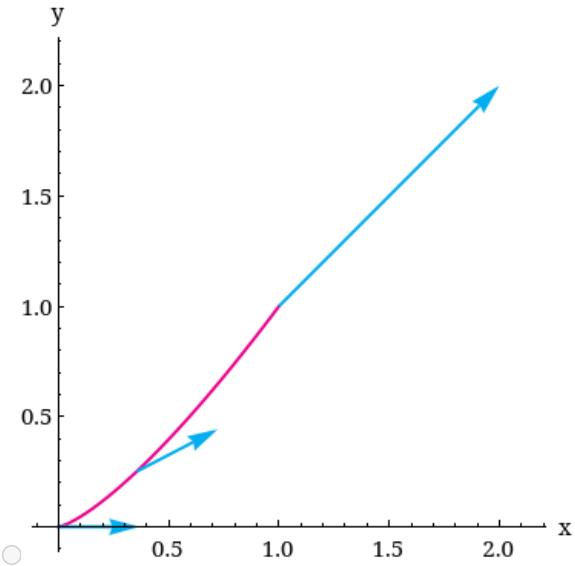
$$1310-1e

(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.









Need Help? Read It Watch It

13. **[2/5 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 15.4.031.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Suppose X and Y are random variables with joint density function.

$$f(x, y) = \begin{cases} 0.1e^{-(0.5x + 0.2y)} & \text{if } x \geq 0,\ y \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

(a) Is f a joint density function?

- (●) Yes
- ( ) No

✔

(b) Find $P(Y \geq 1)$. (Round your answer to four decimal places.)

0.8187 ✔

Find $P(X \leq 3,\ Y \leq 4)$. (Round your answer to four decimal places.)

(No Response)

(c) Find the expected value of X.

(No Response)

Find the expected value of Y.

(No Response)

Need Help? Read It Watch It

14. **[2/2 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 14.8.016.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

This extreme value problem has a solution with both a maximum value and a minimum value. Use Lagrange multipliers to find the extreme values of the function subject to the given constraint.

$$f(x_1, x_2, \ldots, x_n) = x_1 + x_2 + \ldots + x_n; \quad x_1^2 + x_2^2 + \ldots + x_n^2 = 4$$

maximum value $\$2\sqrt{n}$

✔

minimum value $\$-2\sqrt{n}$

✔

Need Help? Read It

15. [2/2 Points] DETAILS PREVIOUS ANSWERS SCALCET9M 14.5.037.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Use the equations to find $\partial z/\partial x$ and $\partial z/\partial y$.

$e^z = 2xyz$

$$2yzez−2xy

$\frac{\partial z}{\partial x} =$

$$2xzez−2xy

$\frac{\partial z}{\partial y} =$

Need Help? Read It Watch It

16. [1/1 Points] DETAILS PREVIOUS ANSWERS SCALCET9M 14.4.043.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Use differentials to estimate the amount of tin in a closed tin can with diameter 6 cm and height 13 cm if the tin is 0.04 cm thick. (Round your answer to two decimal places.)

12.06 cm^3

Need Help? Read It Watch It

17. [1/1 Points] DETAILS PREVIOUS ANSWERS SCALCET9M 15.2.065.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Evaluate the integral by reversing the order of integration.

$$\int_0^1 \int_{\arcsin(y)}^{\pi/2} \cos(x)\sqrt{4+\cos^2(x)}\,dx\,dy$$

$$13(√125−8)

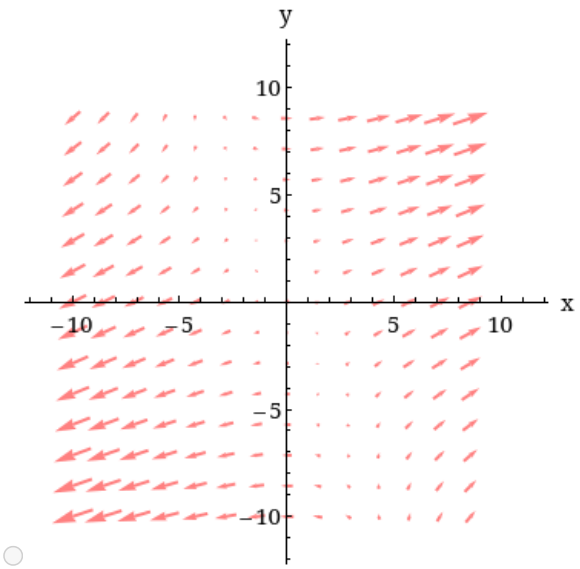
Need Help? Read It Watch It

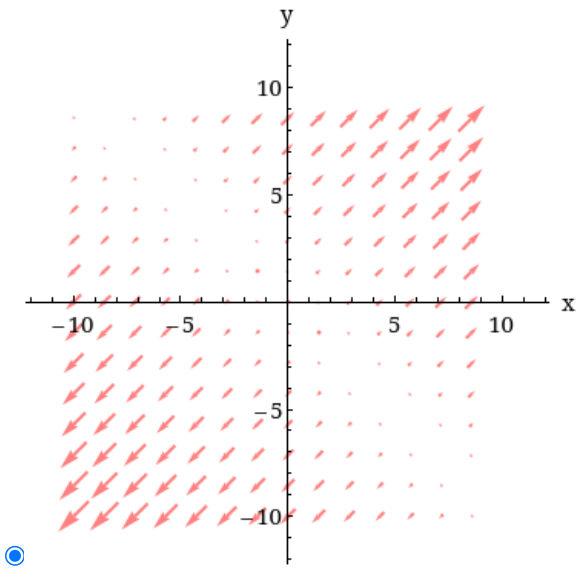
18. [1/1 Points] DETAILS PREVIOUS ANSWERS SCALCET9M 16.1.033.

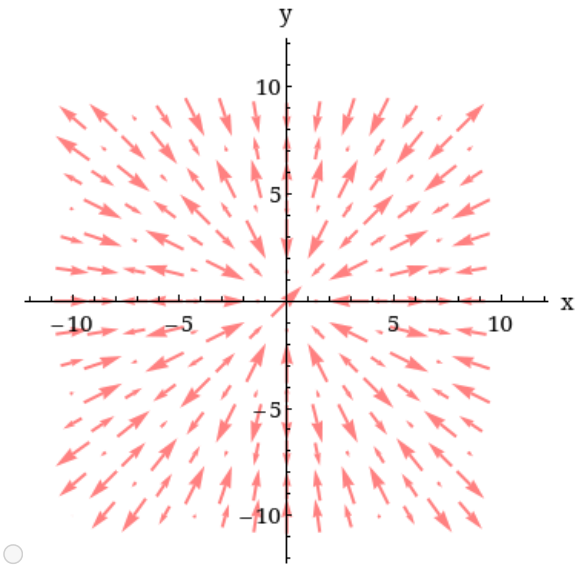
MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

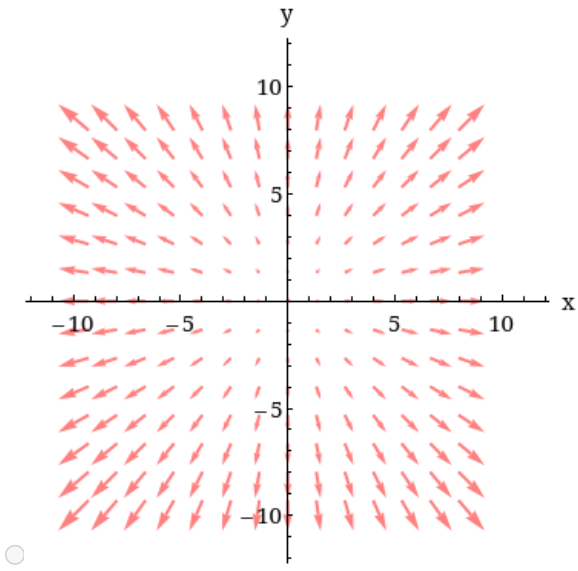
Match the function f with the correct gradient vector field plot.

$f(x, y) = (x + y)^2$









Need Help? Read It Watch It

19. **[2/2 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 14.7.045.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find the points on the cone $z^2 = x^2 + y^2$ that are closest to the point (2, 2, 0).

$$1,1,-\sqrt{2}

$(x, y, z) =$ ( ) (smaller z-value)

$$1,1,\sqrt{2}

$(x, y, z) =$ ( ) (larger z-value)

Need Help? Read It Watch It

20. **[1/1 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 14.2.026.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{(x, y)\to(0, 0)} \frac{xy^4}{x^2 + y^8}$$

$$DNE

Need Help? Read It

21. **[–/1 Points]** DETAILS **SCALCET9M 15.5.014.** MY NOTES ASK YOUR TEACHER

Find the area of the surface.

The part of the sphere $x^2 + y^2 + z^2 = 4z$ that lies inside the paraboloid $z = x^2 + y^2$.

(No Response)

Need Help? Read It

22. **[1/1 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 15.3.022.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Use a double integral to find the area of the region.

The region inside the circle $(x - 2)^2 + y^2 = 4$ and outside the circle $x^2 + y^2 = 4$

$$2\sqrt{3}+4\pi

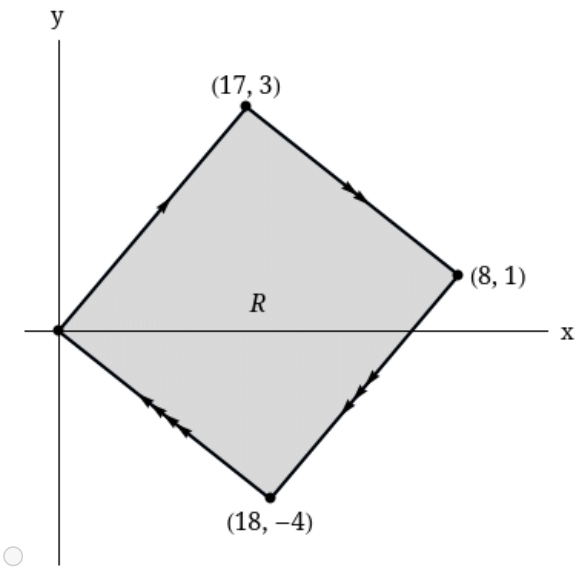
Need Help? Read It Watch It

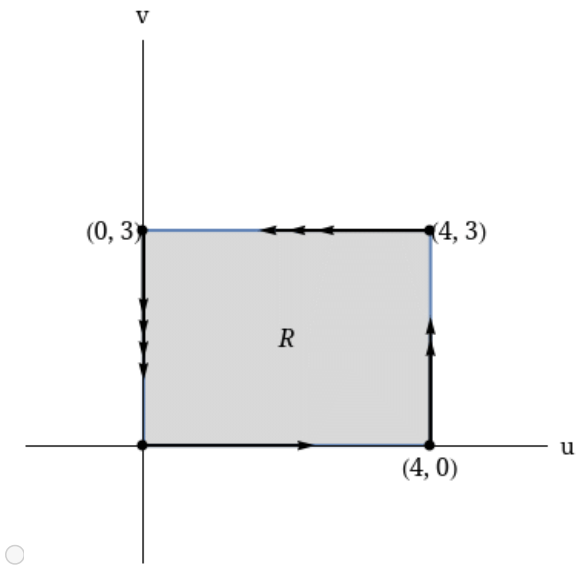
23. **[1/1 Points]** DETAILS PREVIOUS ANSWERS **SCALCET9M 15.9.003.**

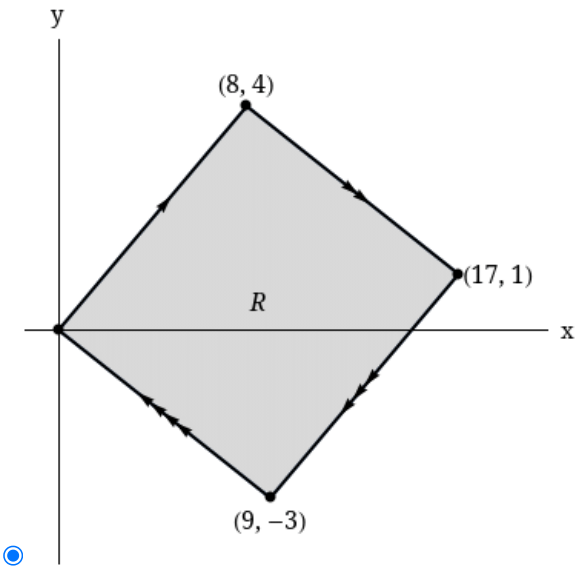
MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

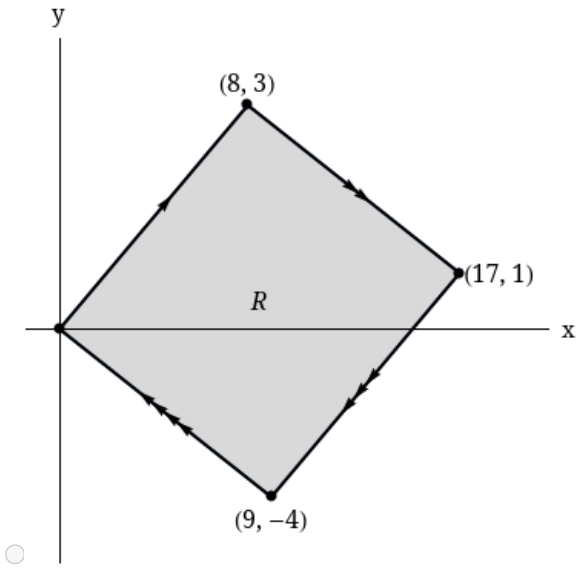
Find the image of the set S under the given transformation.

$S = \{(u, v) \mid 0 \le u \le 4, 0 \le v \le 3\}$;
$x = 2u + 3v, y = u - v$









Need Help? Read It Watch It

24. [–/1 Points] DETAILS SCALCET9M 16.2.044.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

The force exerted by an electric charge at the origin on a charged particle at a point (x, y, z) with position vector $\mathbf{r} = \langle x, y, z \rangle$ is $\mathbf{F}(r) = K\mathbf{r}/|\mathbf{r}|^3$ where K is a constant. Find the work done as the particle moves along a straight line from (2, 0, 0) to (2, 3, 4).

(No Response)

Need Help? Read It

25. [–/1 Points] DETAILS SCALCET9M 15.9.020.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Use the given transformation to evaluate the integral.

$\iint_R (2x^2 - 3xy + 2y^2)\, dA$, where R is the region bounded by the ellipse $2x^2 - 3xy + 2y^2 = 2$; $x = \sqrt{2}u - \sqrt{2/7}\,v$, $y = \sqrt{2}u + \sqrt{2/7}\,v$

(No Response)

Need Help? Read It

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