CENGAGE | WEBASSIGN

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← MC 006, section B, Fall 2019

INSTRUCTOR
Christiaan Ketelaar
Universidad Francisco Marroquin

6.1 Área entre Curvas (Homework)

Current Score

QUESTION	1	2	3	4	5	6
POINTS	3/3 ✔	3/3 ✔	3/3 ✔	3/3 ✔	3/3 ✔	3/3 ✔

TOTAL SCORE

18/18 100.0%

Due Date

DECEMBER 21
11:59 PM CST

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Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score.

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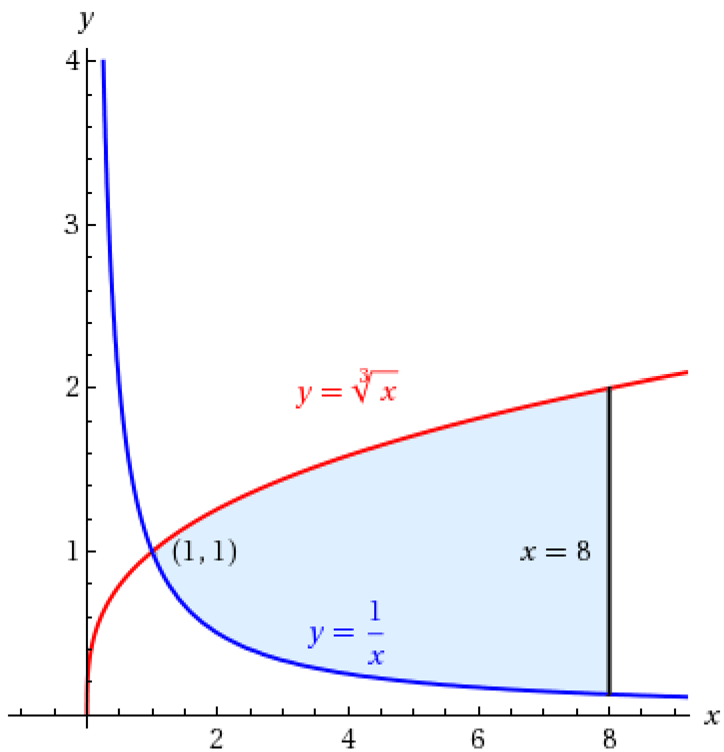
1. 3/3 points Previous Answers SCalcET8 6.1.001. My Notes Ask Your Teacher

Find the area of the shaded region.

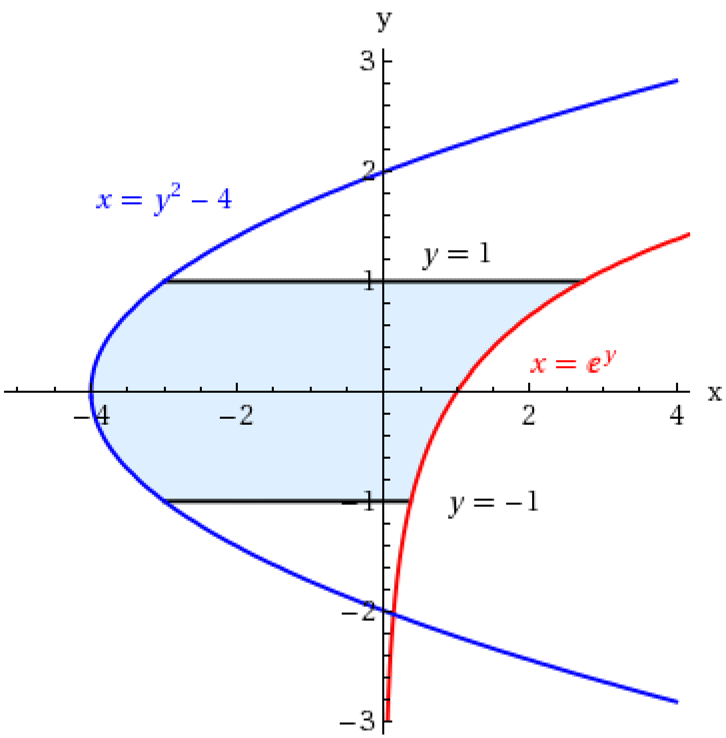
12−ln(8)−34



2. 3/3 points Previous Answers SCalcET8 6.1.003. My Notes Ask Your Teacher

Find the area of the shaded region.

223+e−1e

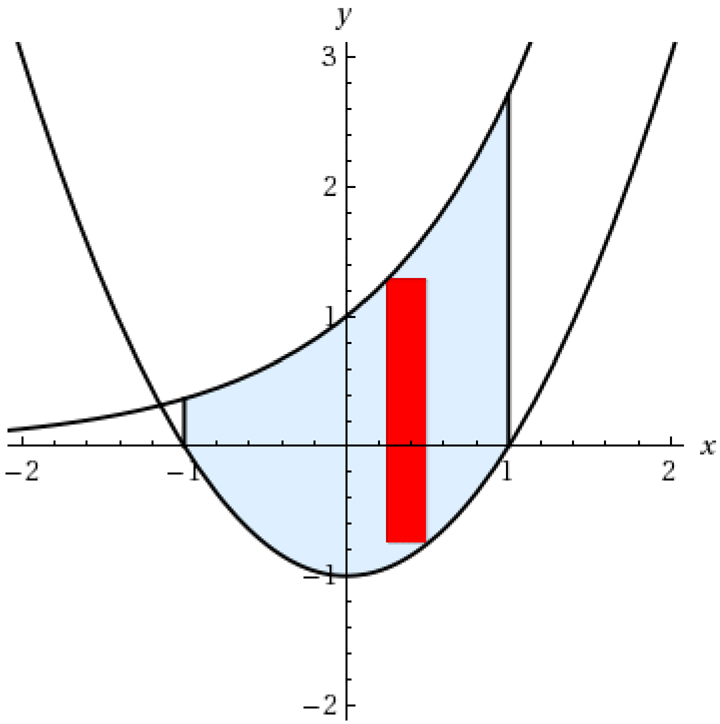


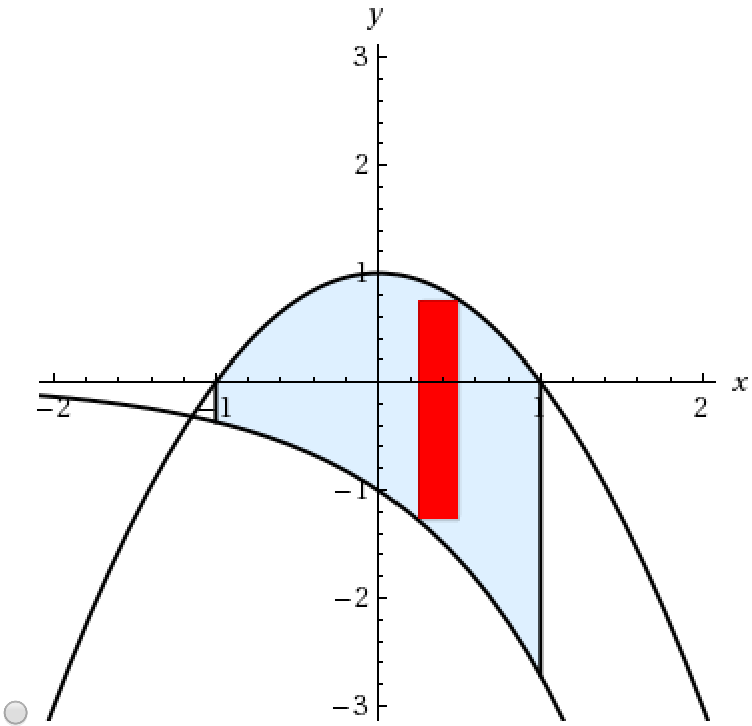
Need Help? Watch It Talk to a Tutor

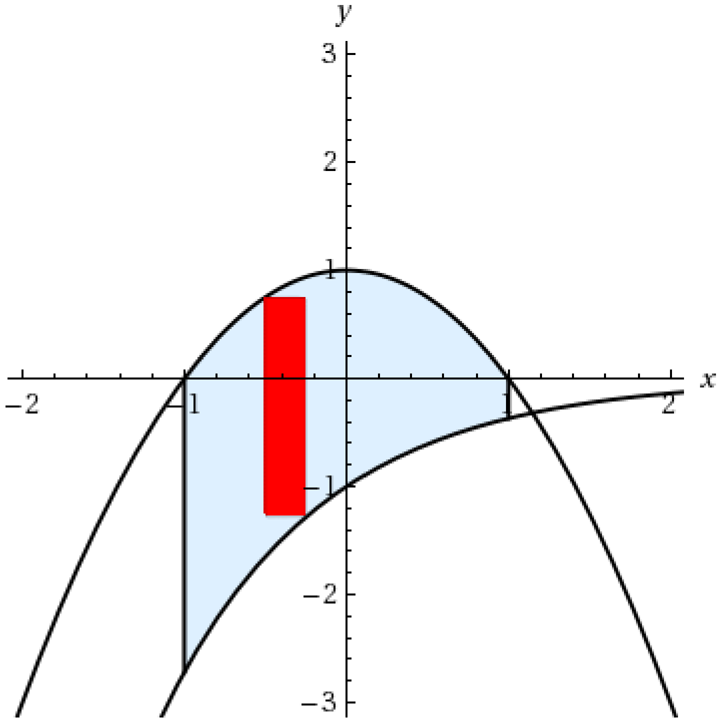
3. 3/3 points Previous Answers SCalcET8 6.1.005. My Notes Ask Your Teacher

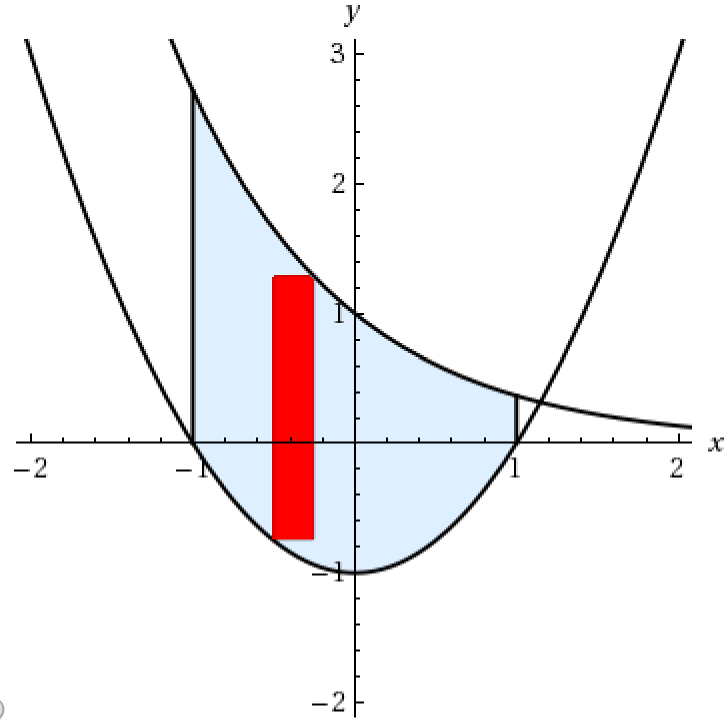
Sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle.

$y = e^x, \; y = x^2 - 1, \; x = -1, \; x = 1$









Find the area of the region.

e−e−1+43

4. 3/3 points Previous Answers SCalcET8 6.1.011.MI.SA. My Notes Ask Your Teacher

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

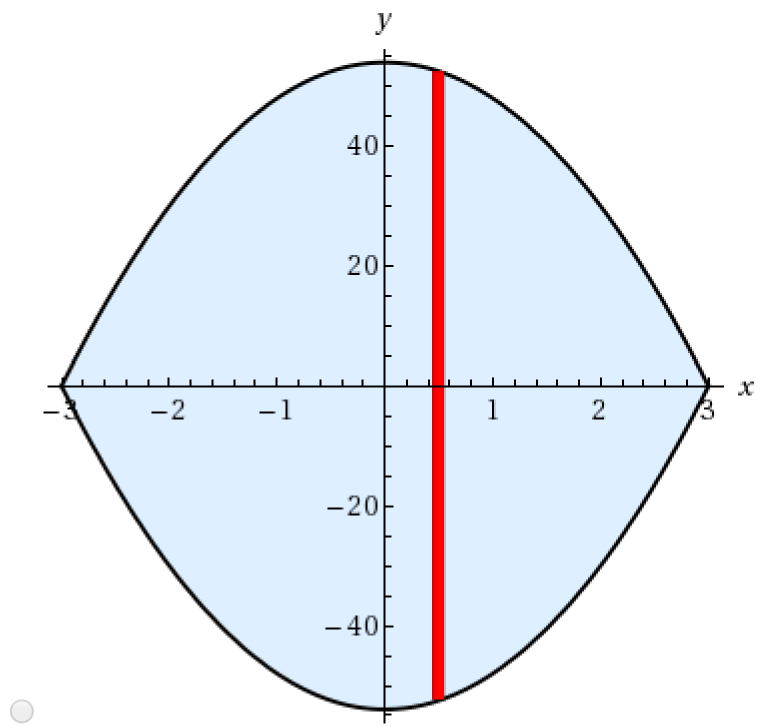
Tutorial Exercise

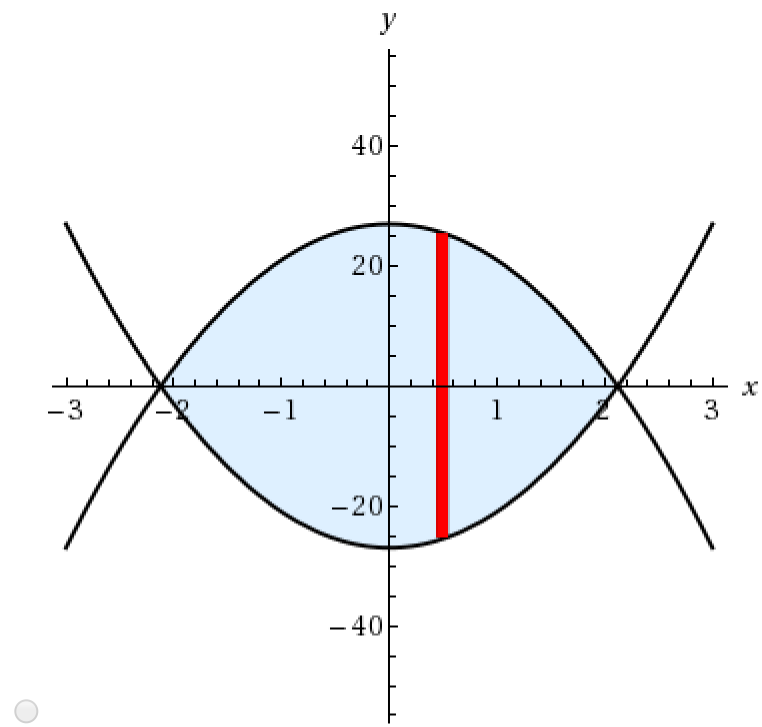
Sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. Find the area of the region.

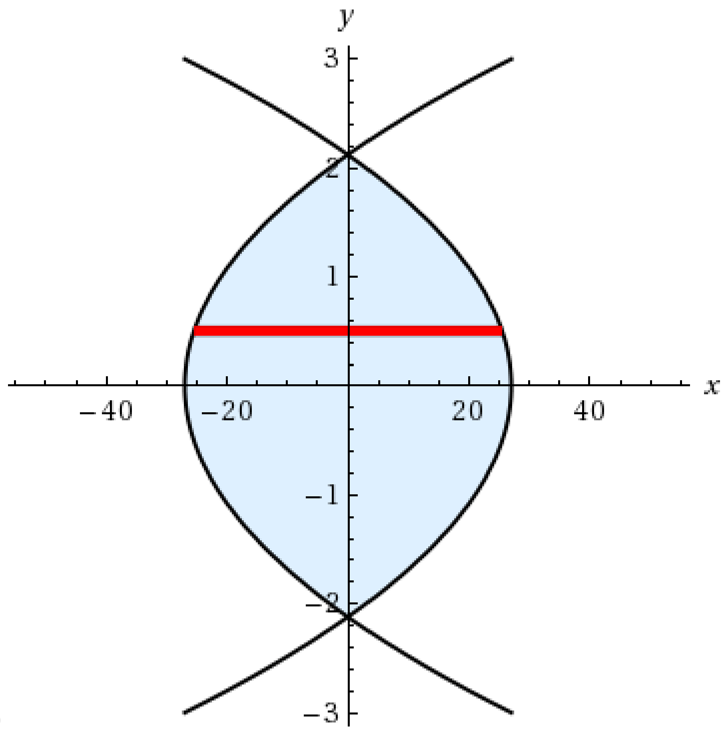
$$x = 54 - 6y^2, \quad x = 6y^2 - 54$$

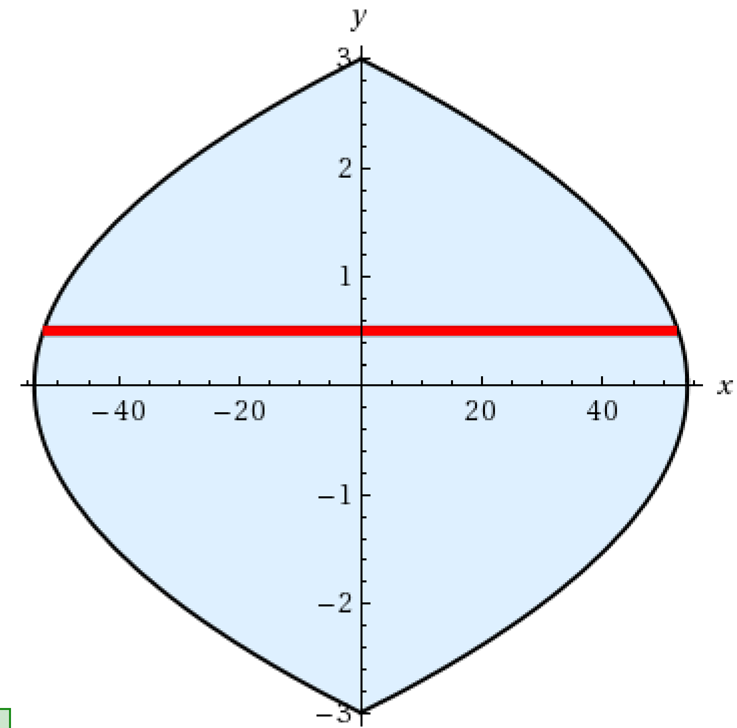
Step 1

Sketch the region.









Step 2

We will find this area by integrating with respect to y.

The integrand is obtained by taking the right-hand function minus the left-hand function, or

$\left(54 - 6y^2 - \left(\right.\right.$

$$6y2−54

$\boxed{6y^2 - 54}$$\left.\left.\right)\right)$.

Step 3

The limits on the integral are the y-values where the curves intersect.

Equating $54 - 6y^2 = 6y^2 - 54$, we find that the two solutions are $y_1 = -3$ and $y_2 = \boxed{3}$ 3 .

Step 4

Now, the area is given by

$$\int_{-3}^{3} [(54 - 6y^2) - (6y^2 - 54)]\, dy = \int_{-3}^{3} \left(\boxed{108 - 12y^2} \right) dy.$$

$$108−12y2

Step 5

We have

$$\int_{-3}^{3} (108 - 12y^2)\, dy = \left[\boxed{108y - 4y^3} \right]_{-3}^{3}.$$

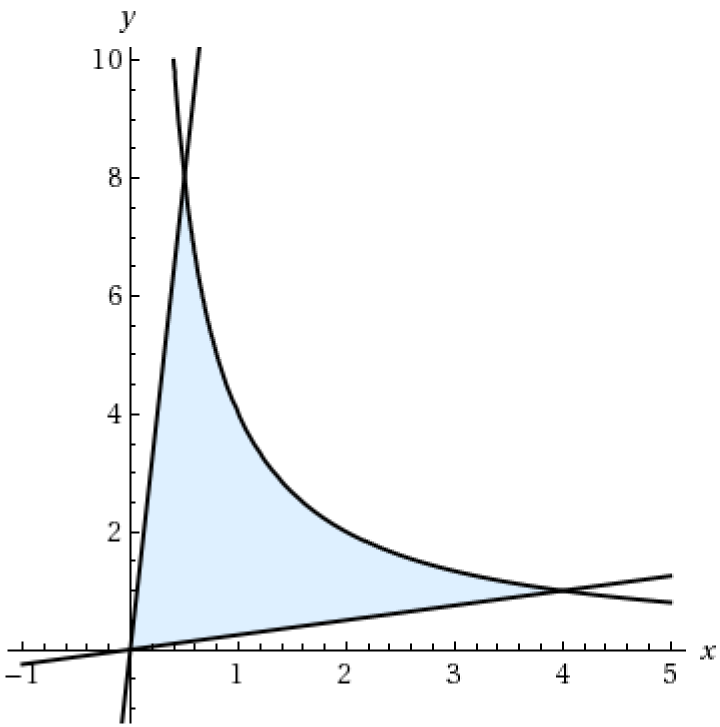
$$108y−4y3

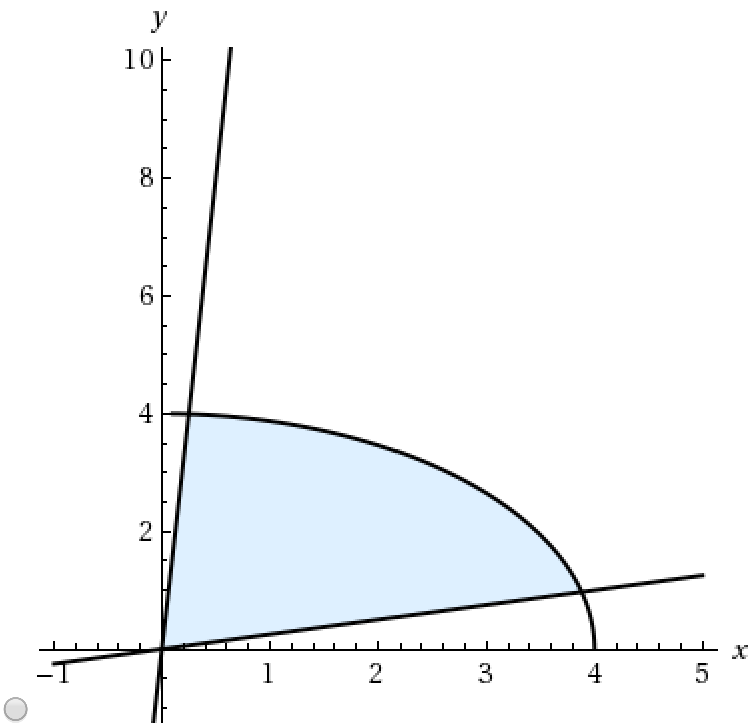
Performing this operation and simplifying fully gives us the exact area of the region, 432 432 .
You have now completed the Master It.

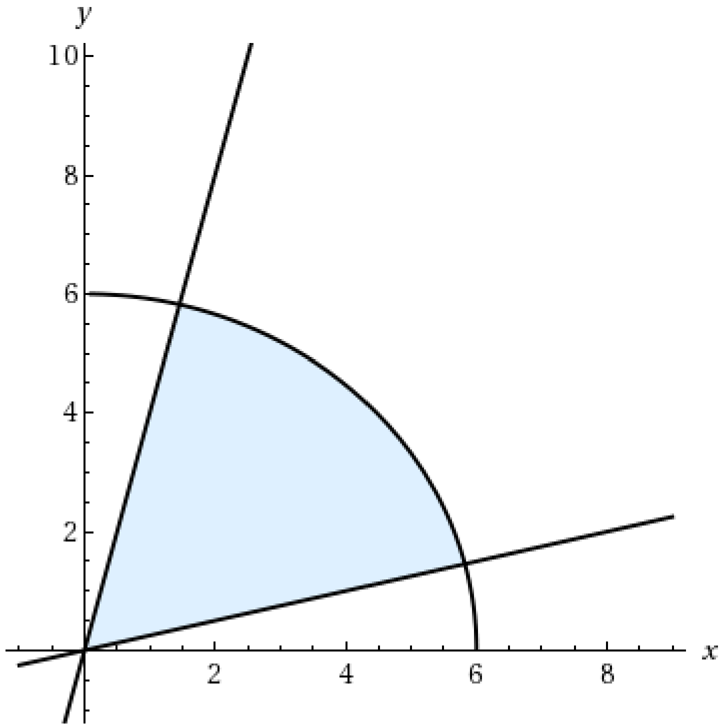
5. **3/3 points** **Previous Answers** **SCalcET8 6.1.027.** My Notes Ask Your Teacher

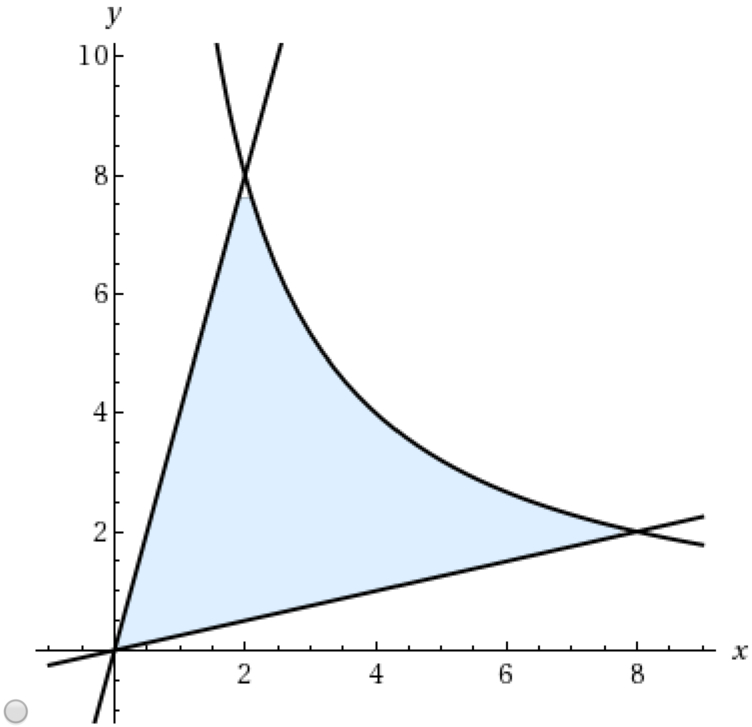
Sketch the region enclosed by the given curves.

$$y = 4/x, \quad y = 16x, \quad y = \frac{1}{4}x, \quad x > 0$$





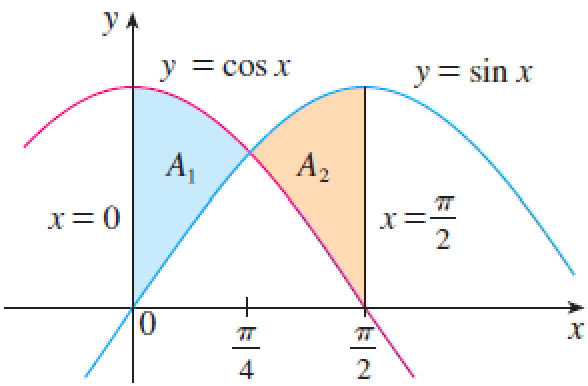




Find its area.

4(*ln*(4)−*ln*(12))

6. 3/3 points Previous Answers SCalcET8 6.1.AE.005. My Notes Ask Your Teacher



Video Example

EXAMPLE 5 Find the area of the region bounded by the curves $y = \sin(x)$, $y = \cos(x)$, $x = 0$, and $x = \pi/2$.

SOLUTION The points of intersection occur when $\sin(x) = \cos(x)$, that is, when $x =$ π4 (since $0 \le x \le \pi/2$). The region is sketched in the figure. Observe that $\cos(x) \ge \sin(x)$ when 0 $\le x \le$ π4, but $\sin(x) \ge \cos(x)$ when π4 $\le x \le$ π2. Therefore the required area is

$$A = \int_0^{\pi/2} |\cos(x) - \sin(x)|\, dx = A_1 + A_2$$

$$= \int_0^{\pi/4} (\cos(x) - \sin(x))\, dx + \int_{\pi/4}^{\pi/2} (\sin(x) - \cos(x))\, dx$$

$$= \Big[\quad \sin(x)+\cos(x) \quad \Big]_0^{\pi/4} + \Big[\quad -\cos(x)-\sin(x) \quad \Big]_{\pi/4}^{\pi/2}$$

$$= \Big(\quad \sqrt{2} \quad - 0 - 1 \Big) + \Big(-0 - 1 + \quad \sqrt{2} \quad \Big)$$

$$= 2\sqrt{2} - 2.$$

In this particular example we could have saved some work by noticing that the region is symmetric about $x = \pi/4$ and so

$$A = 2A_1 = 2\int_0^{\pi/4} (\cos(x) - \sin(x))\, dx.$$

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