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INSTRUCTOR

Christiaan Ketelaar
Universidad Francisco Marroquin

6.2 - 6.3 Volúmenes (Homework)

Current Score

QUESTION

1

2

3

4

5

6

7

8

9

10

POINTS

3/3

3/3

3/3

3/3

3/3

3/3

3/3

3/3

3/3

3/3



TOTAL SCORE


30/30

100.0%

Due Date

DECEMBER 21
11:59 PM CST

 Request Extension

<div> Description</div> <div></div>	<div></div> <div><div>Assignment Submission & Scoring</div><div><div>Assignment Submission</div><p>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.</p><div>Assignment Scoring</div><p>Your last submission is used for your score.</p></div></div>
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1. **3/3 points** Previous Answers SCalcET8 6.2.001.[My Notes](#)[Ask Your Teacher](#)

Find the volume V of the solid obtained by rotating the region bounded by the given curves about the specified line.

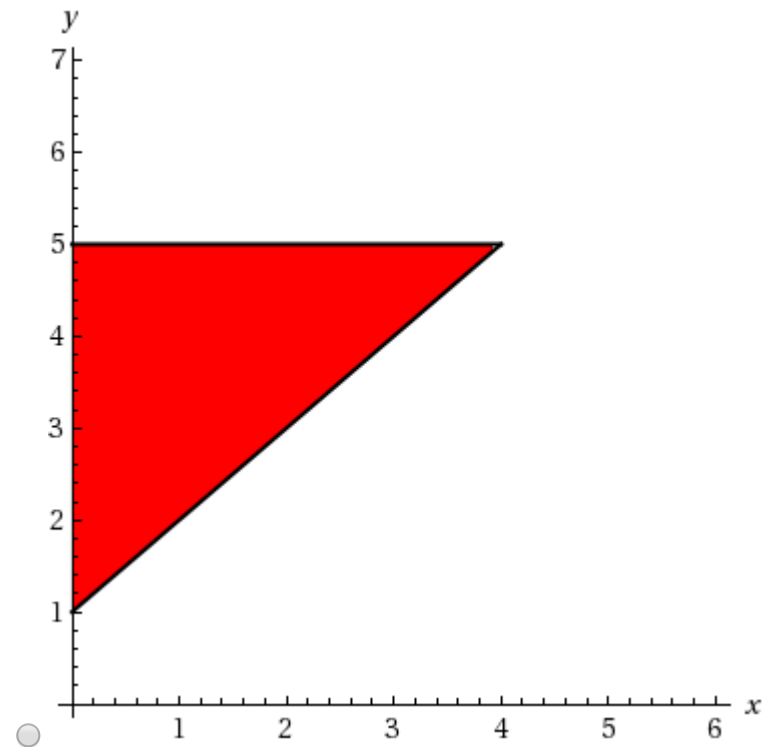
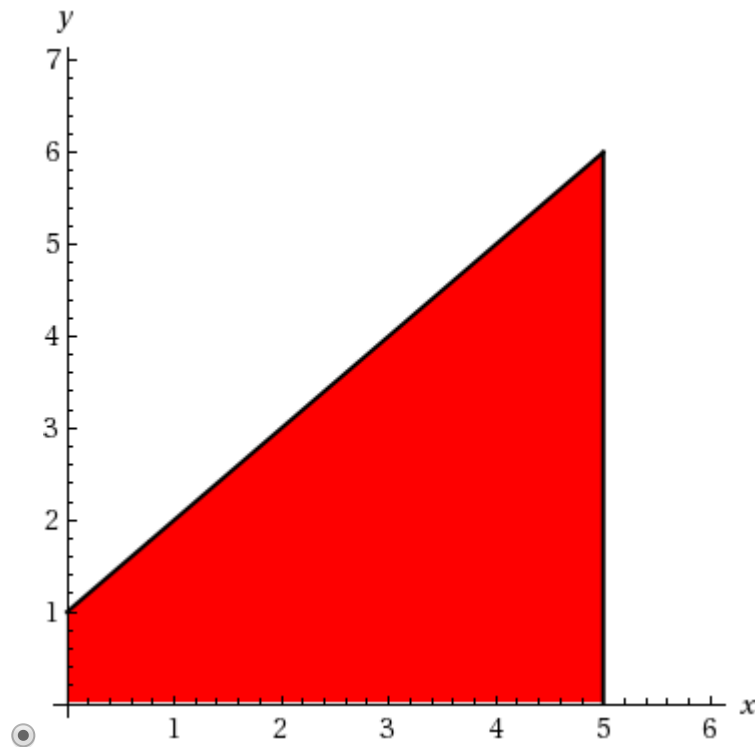
$$y = x + 1, y = 0, x = 0, x = 5; \text{ about the } x\text{-axis}$$

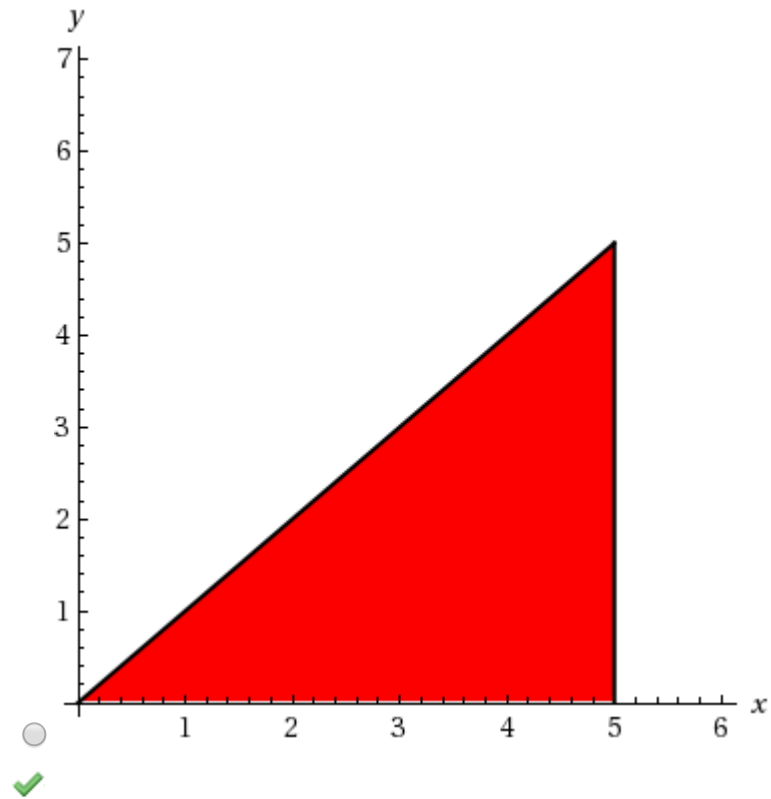
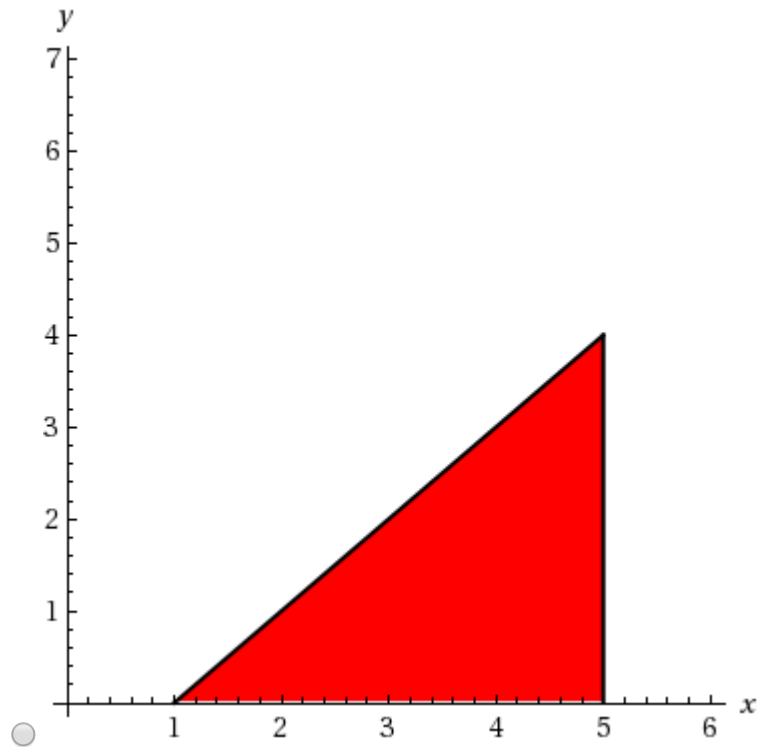
 $V =$

n2153

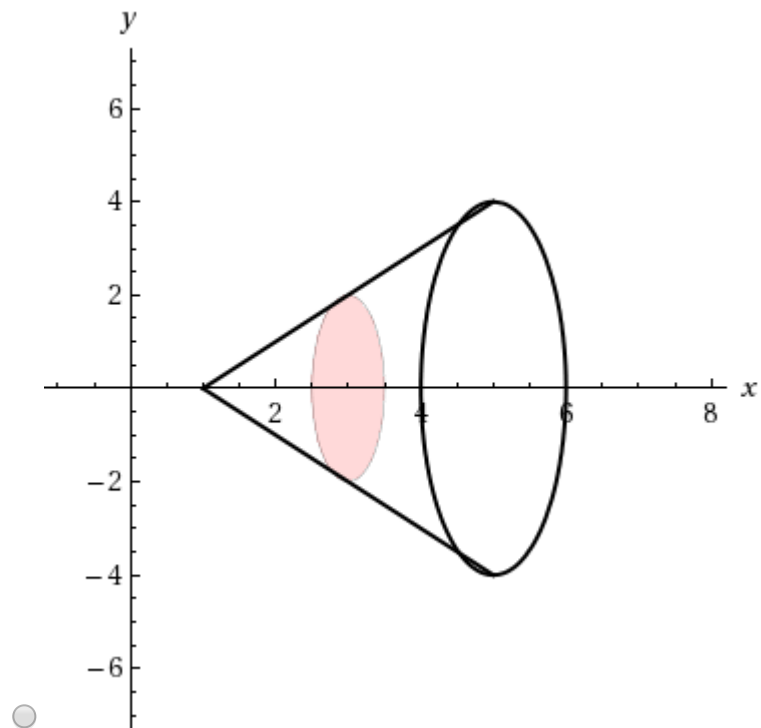
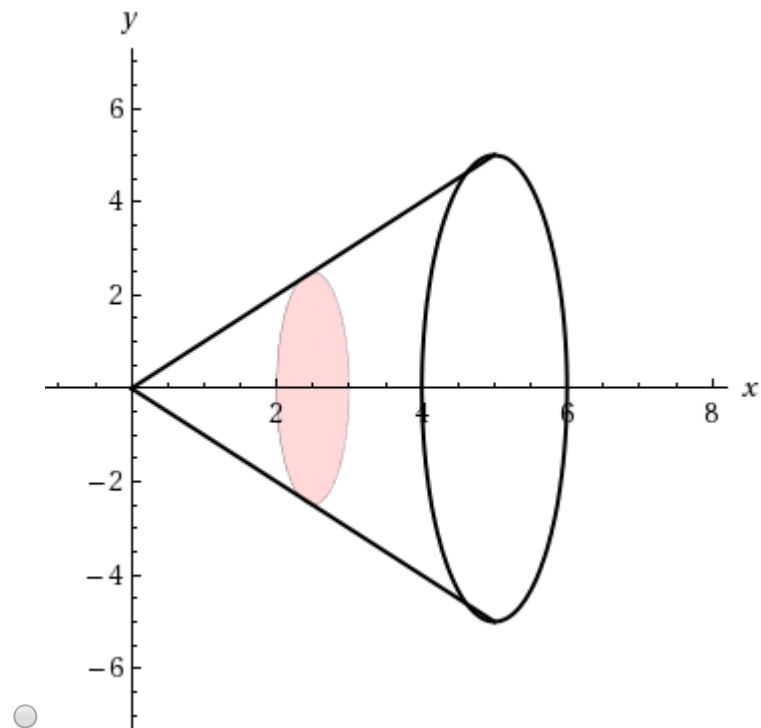


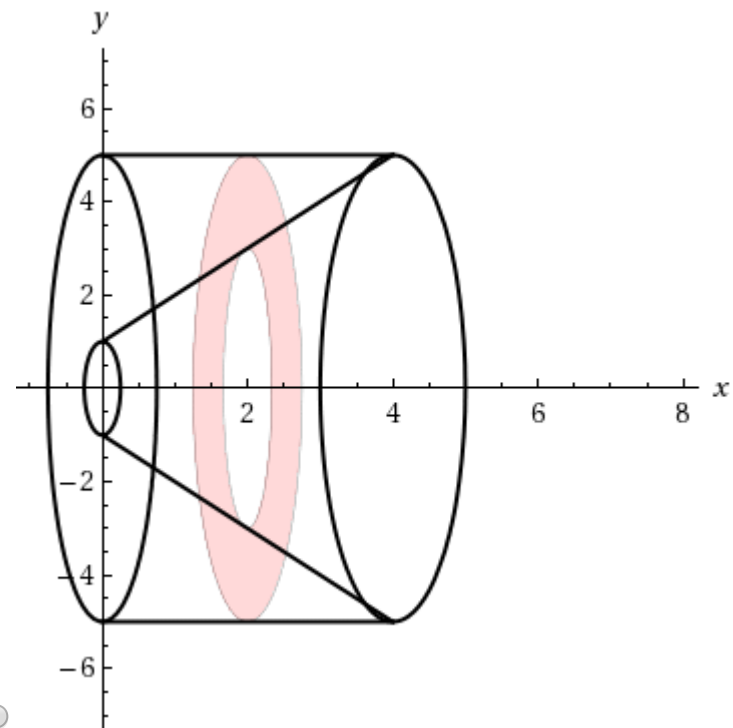
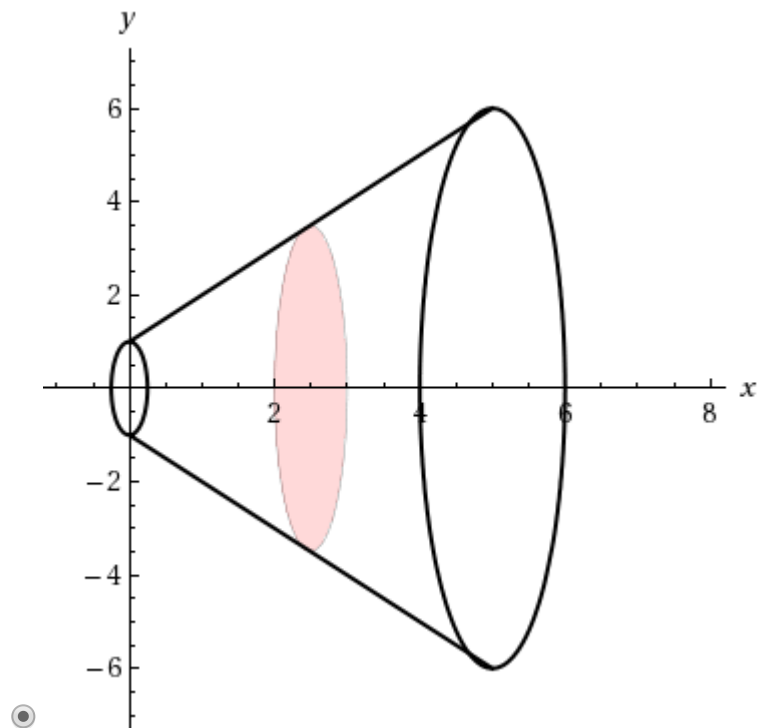
Sketch the region.





Sketch the solid, and a typical disk or washer.





2. **3/3 points** [Previous Answers](#) SCalcET8 6.2.003.[My Notes](#)[Ask Your Teacher](#)

Find the volume V of the solid obtained by rotating the region bounded by the given curves about the specified line.

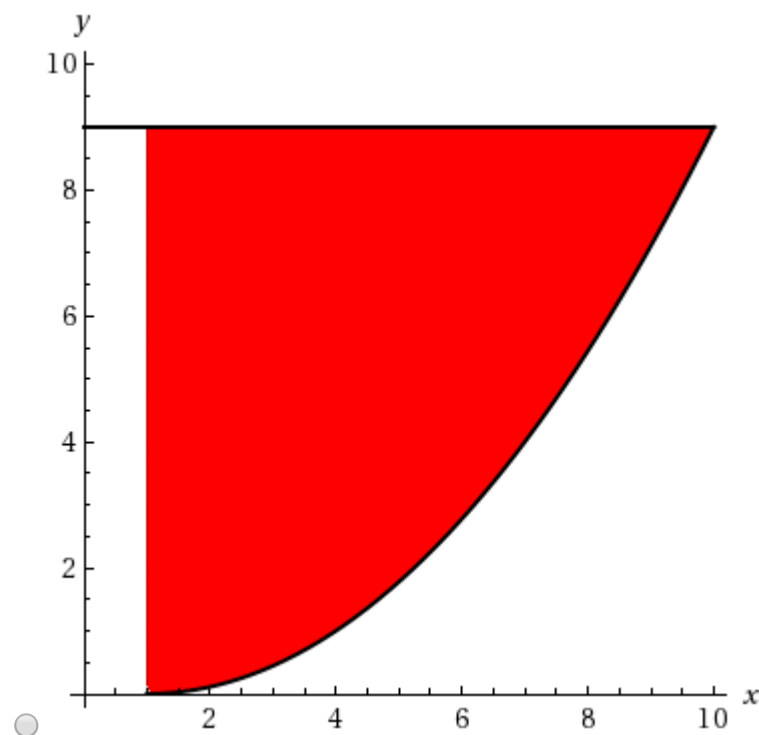
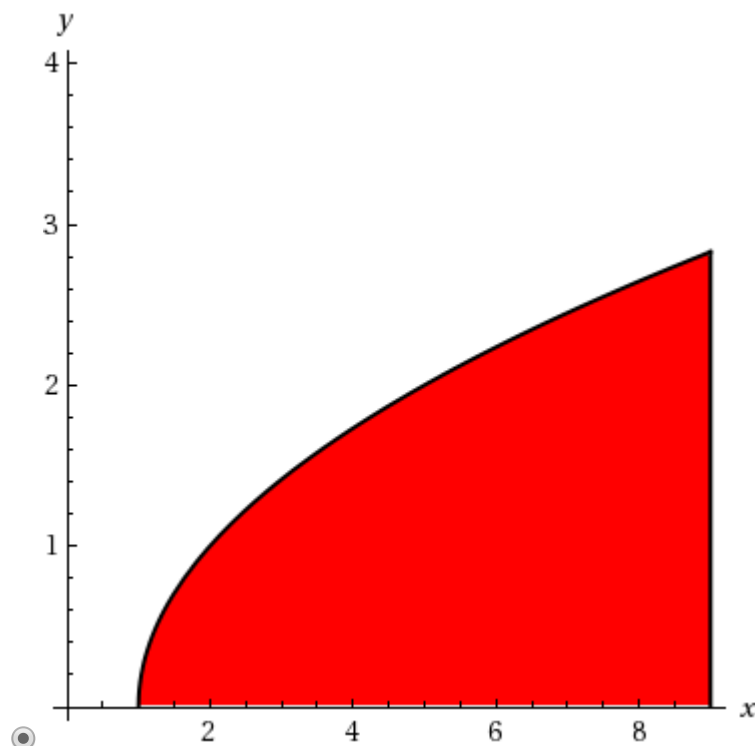
$$y = \sqrt{x-1}, y = 0, x = 9; \text{ about the } x\text{-axis}$$

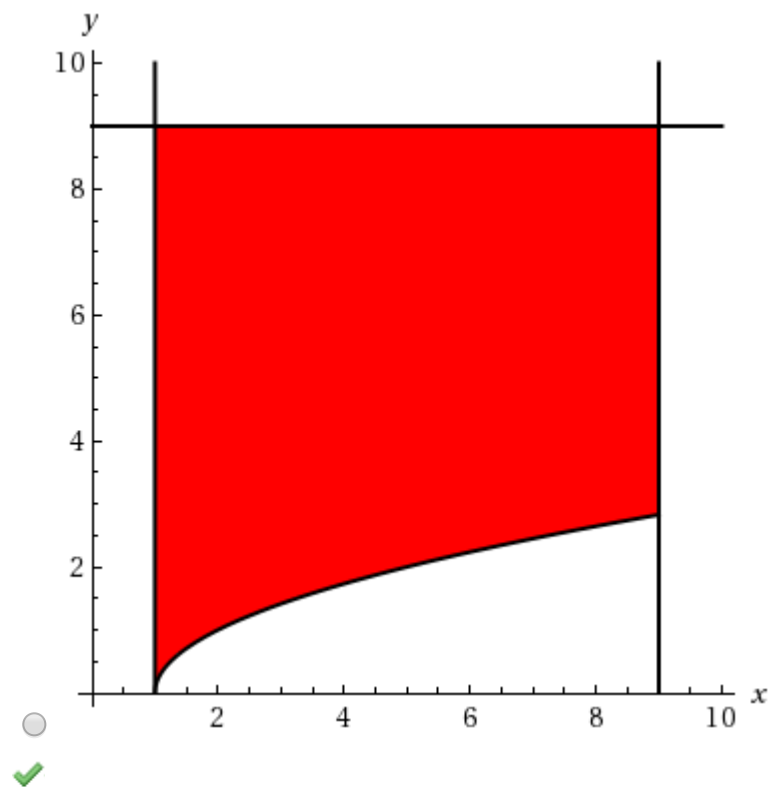
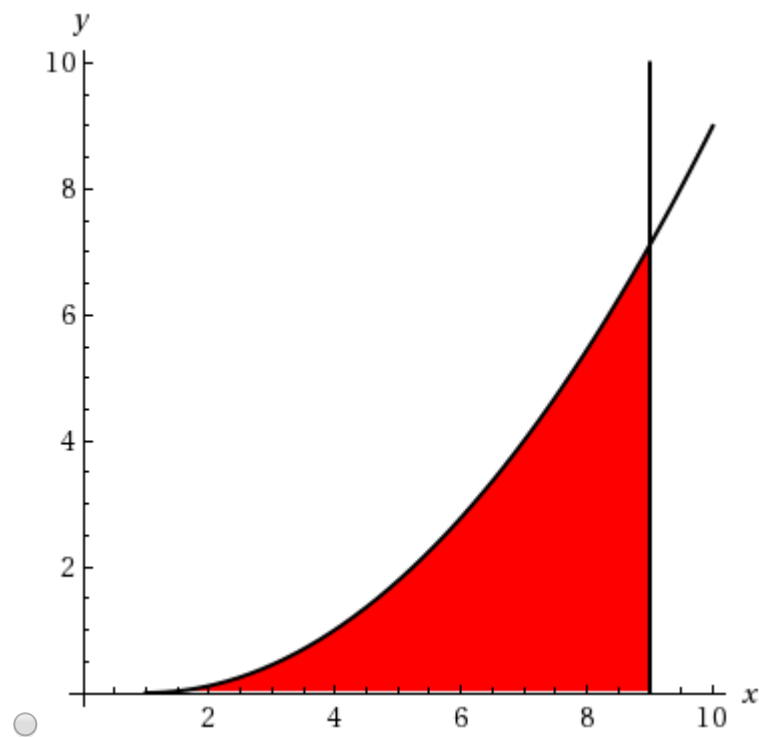
 $V =$

n32

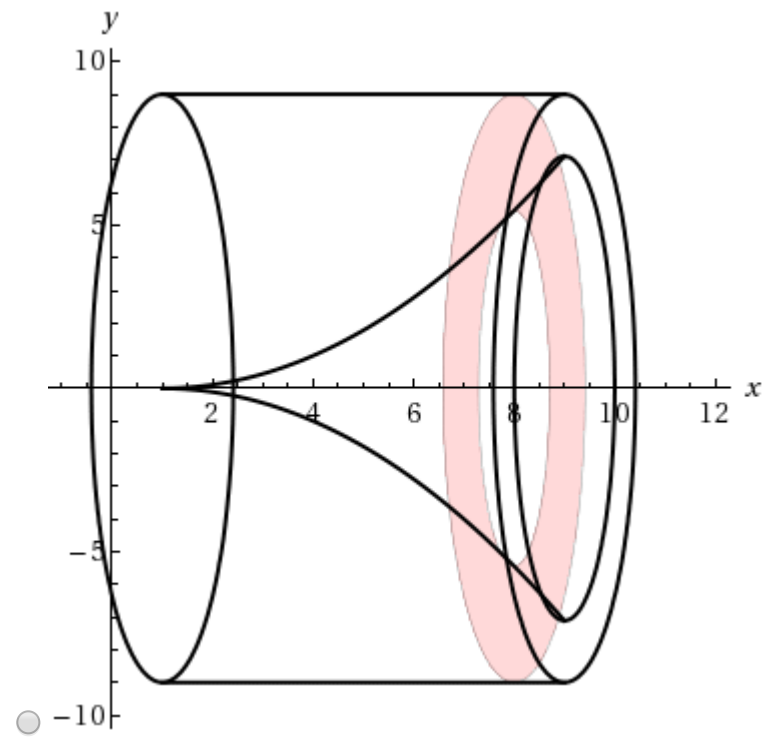
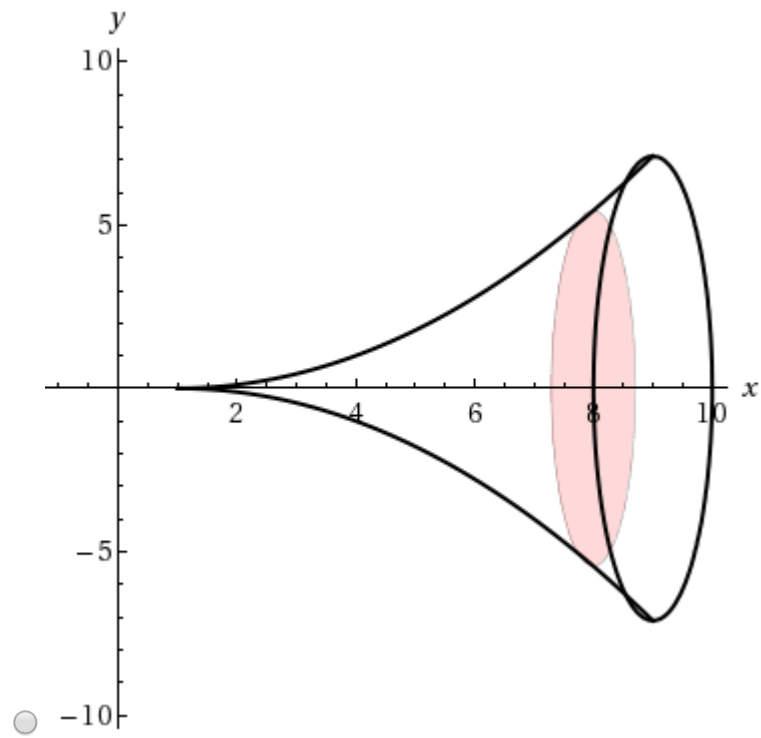


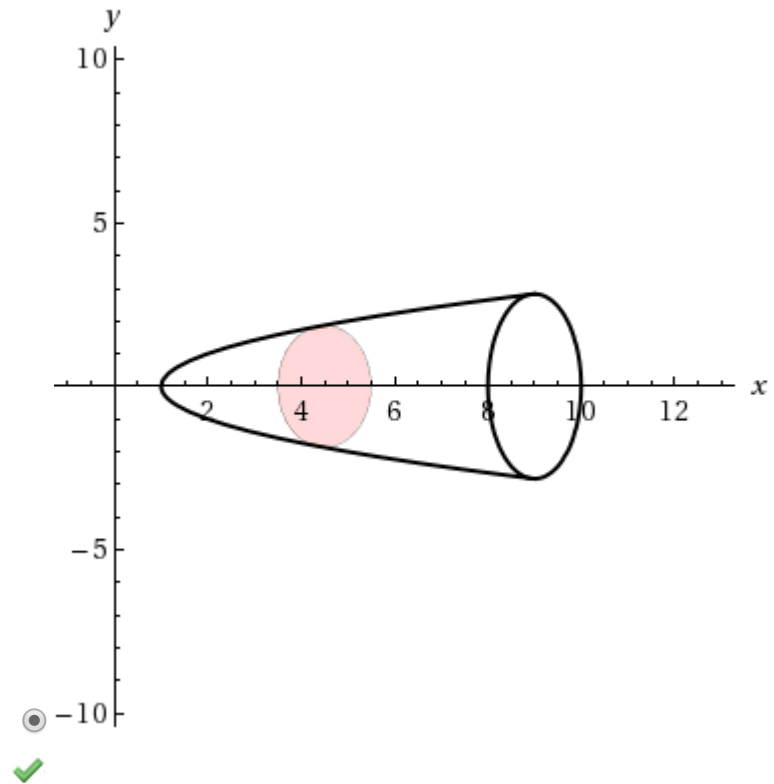
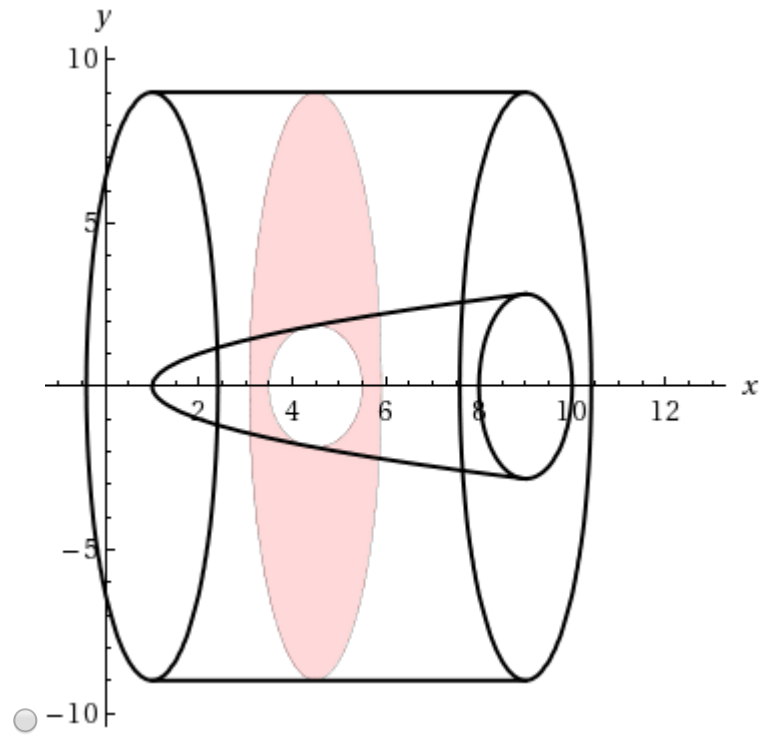
Sketch the region.





Sketch the solid, and a typical disk or washer.





3. **3/3 points** Previous Answers SCalcET8 6.2.005.[My Notes](#)[Ask Your Teacher](#)

Find the volume V of the solid obtained by rotating the region bounded by the given curves about the specified line.

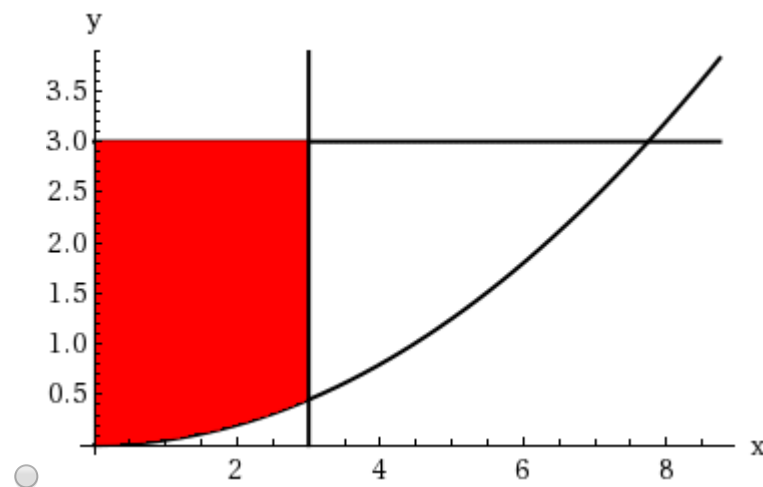
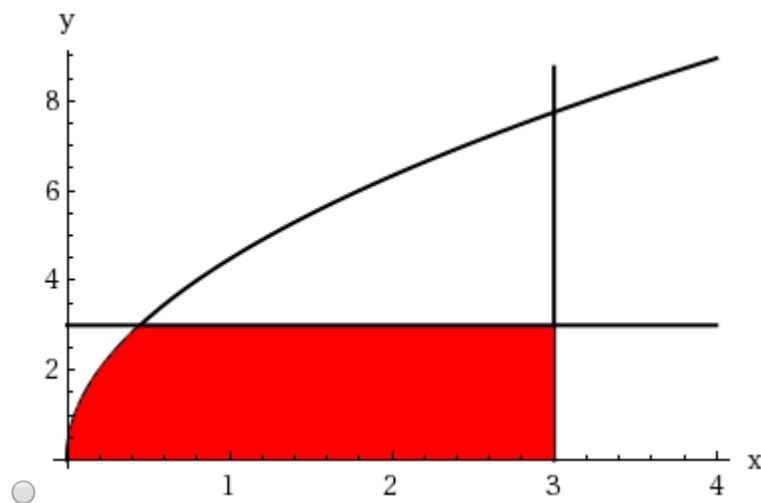
$$x = 2\sqrt{5y}, x = 0, y = 3; \quad \text{about the } y\text{-axis}$$

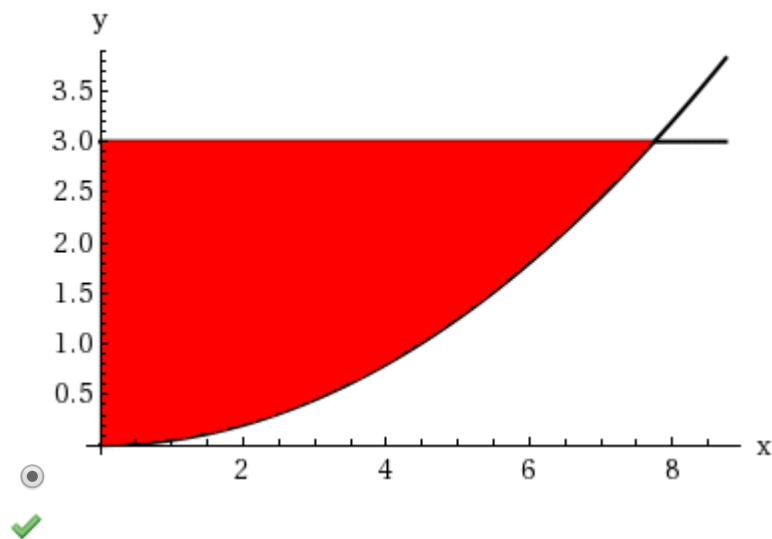
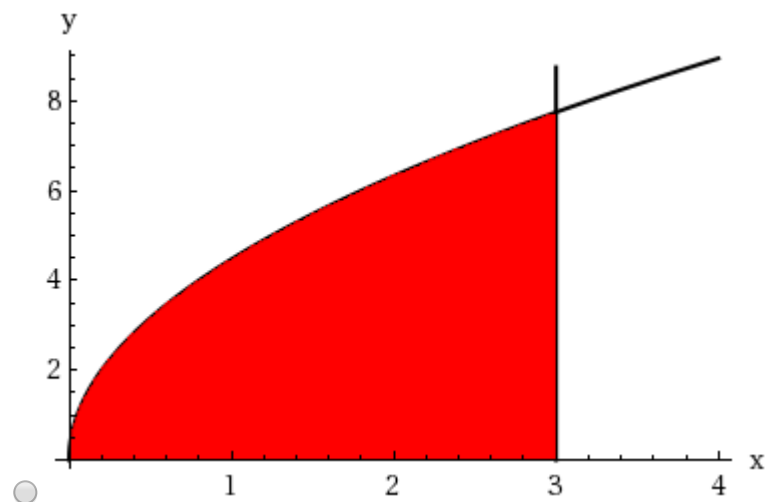
$V =$

90π

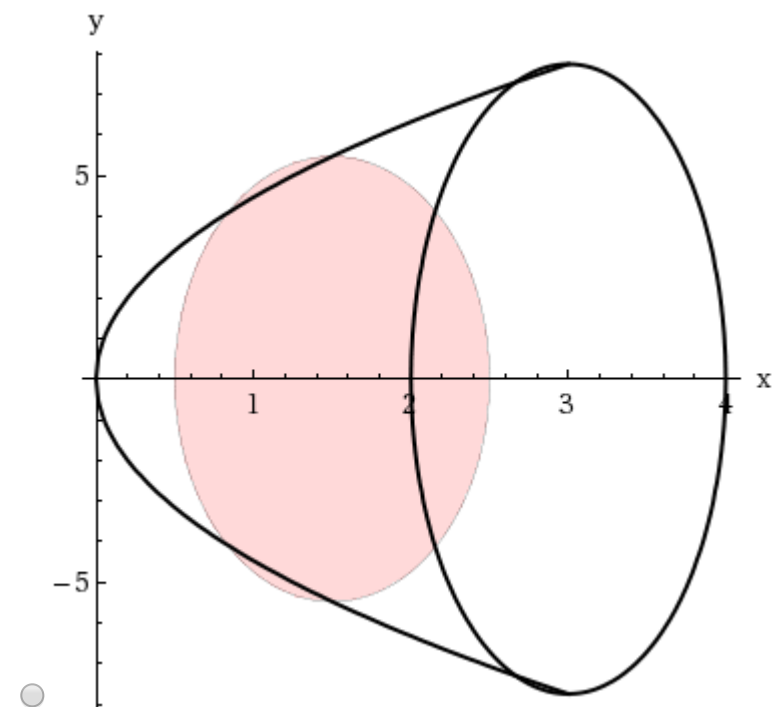
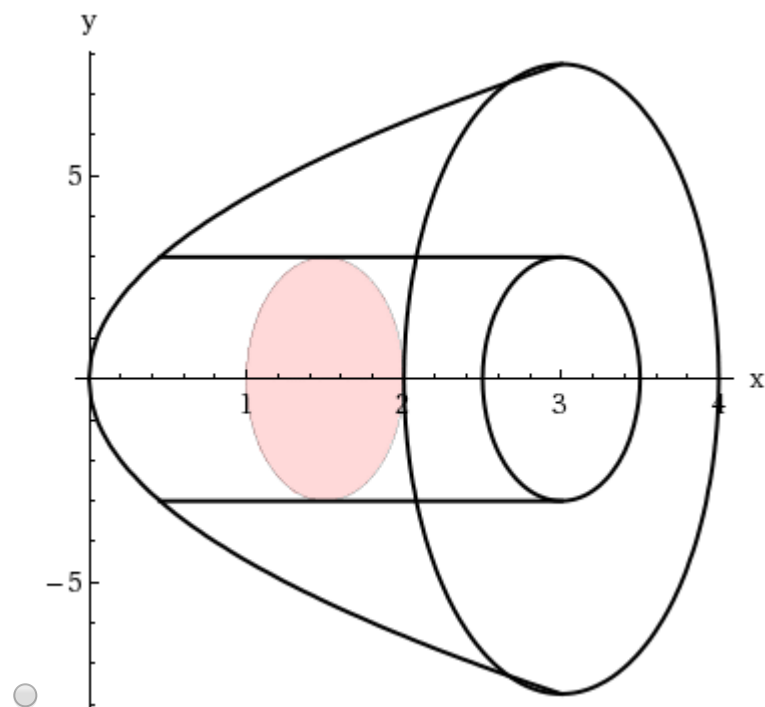


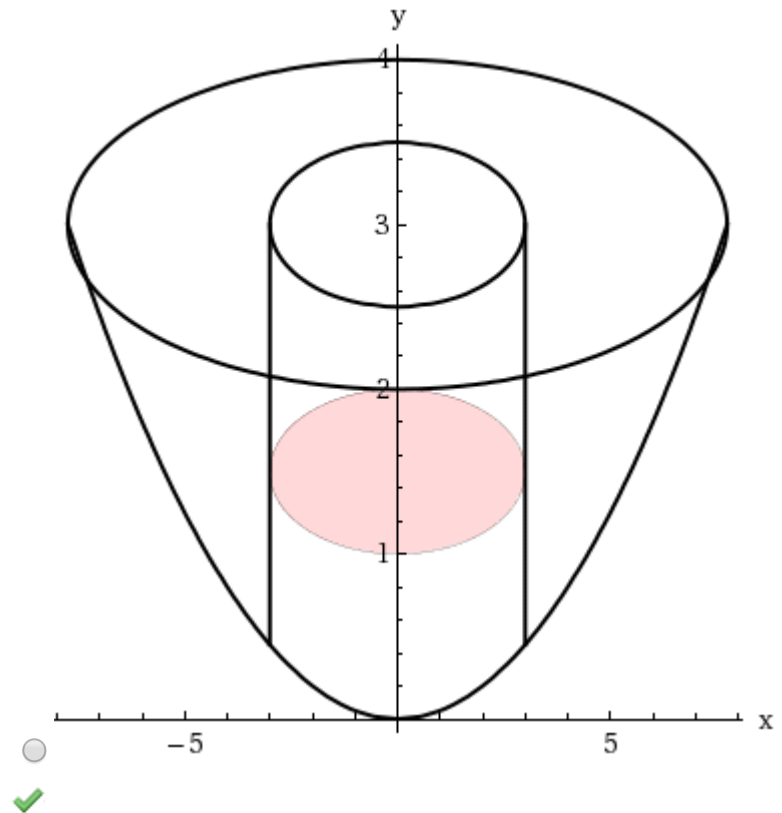
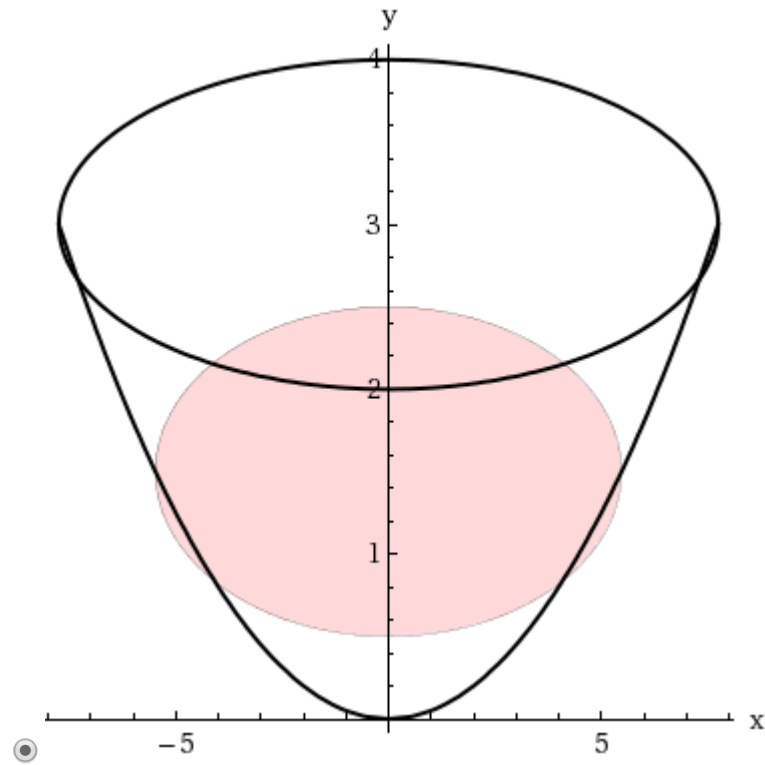
Sketch the region.





Sketch the solid, and a typical disk or washer.





4. **3/3 points** Previous Answers SCalcET8 6.2.007.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

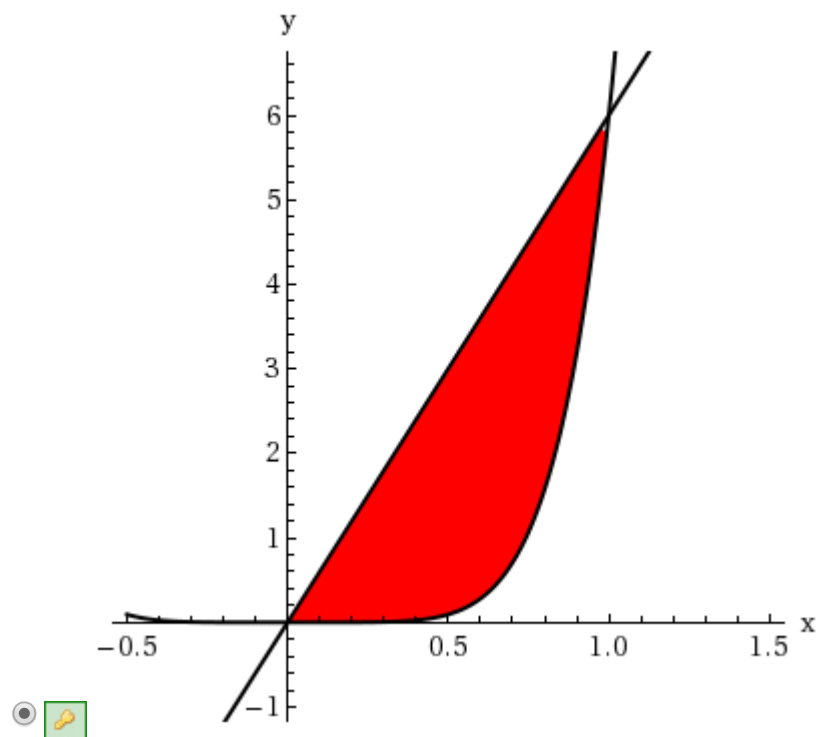
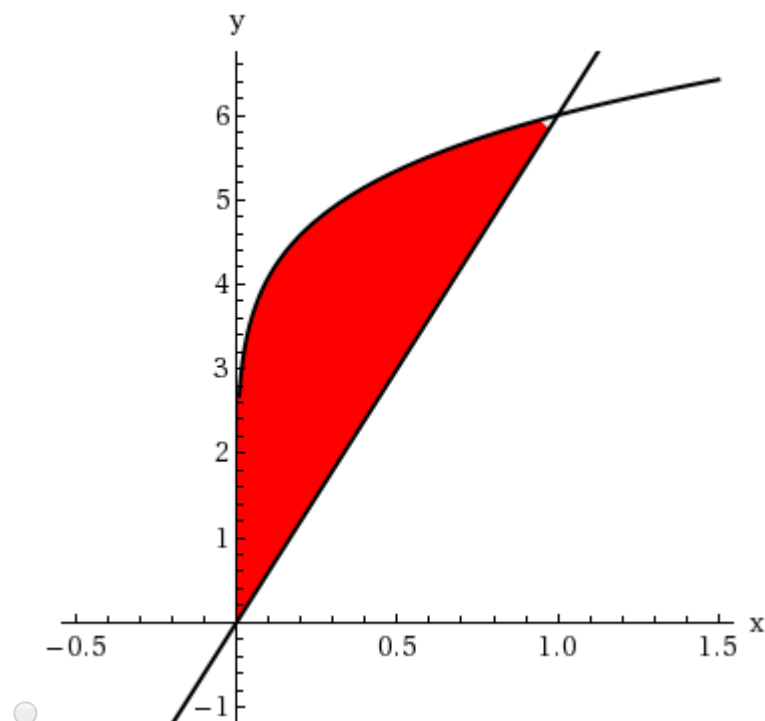
Find the volume V of the solid obtained by rotating the region bounded by the given curves about the specified line.

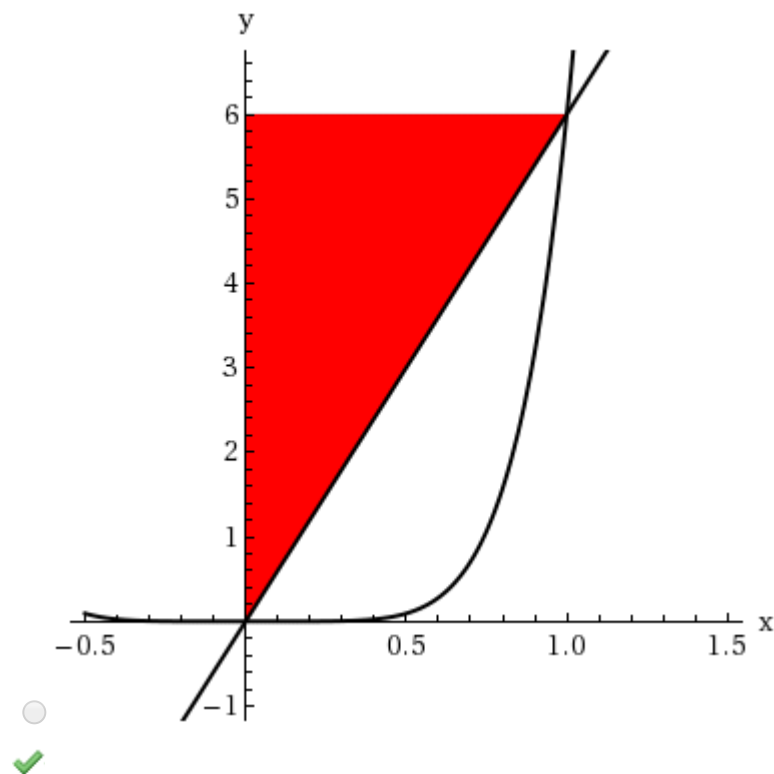
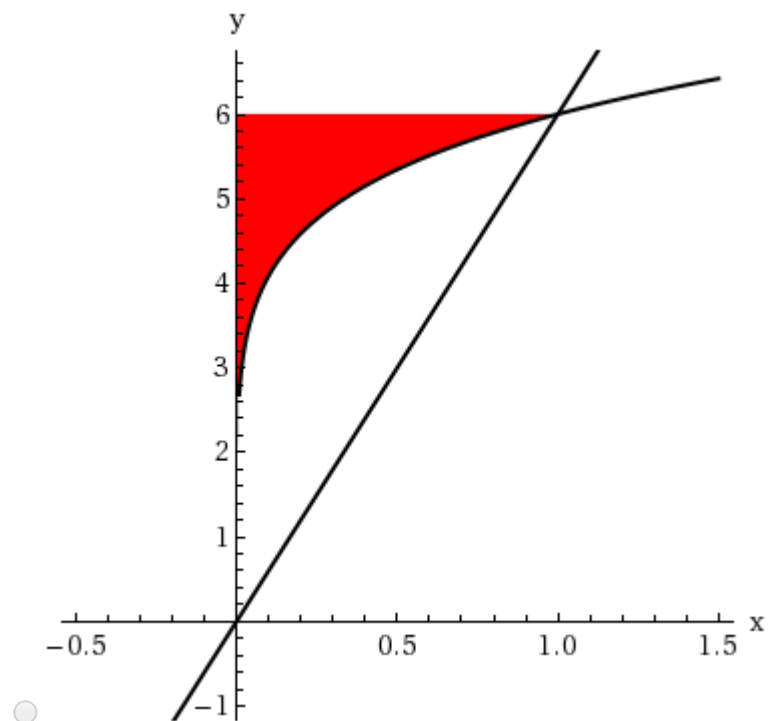
$$y = 6x^6, \quad y = 6x, \quad x \geq 0; \quad \text{about the } x\text{-axis}$$

Step 1

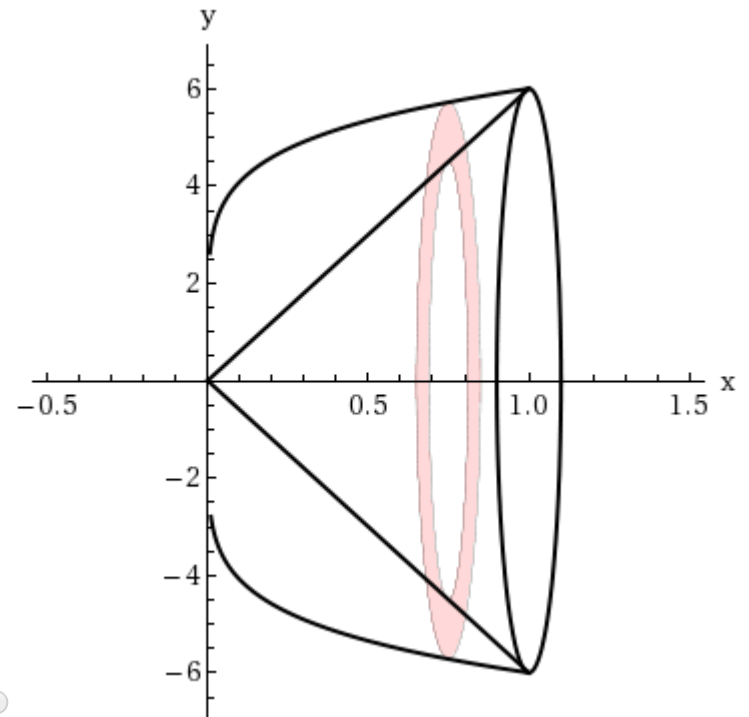
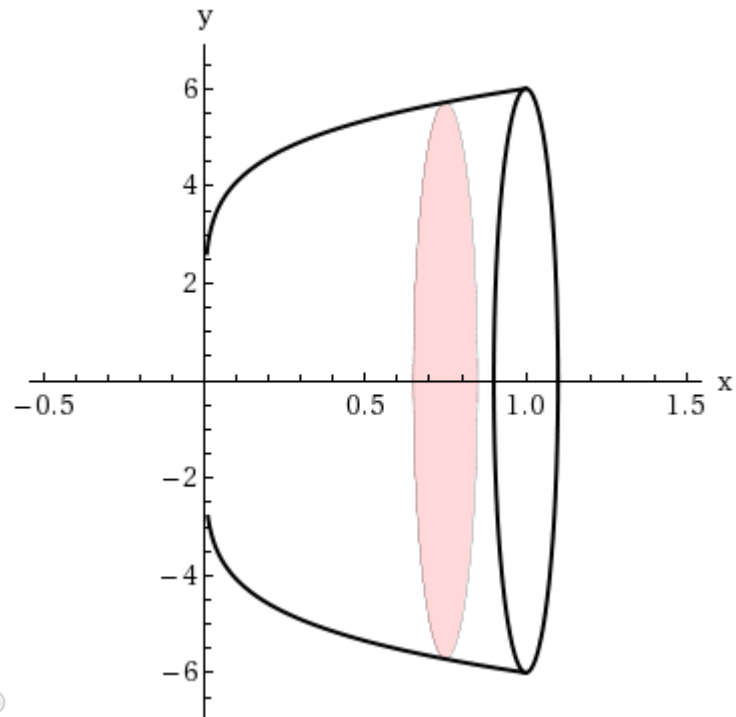
Rotating a vertical strip between $y = 6x^6$ and $y = 6x$ around the x -axis creates a   .

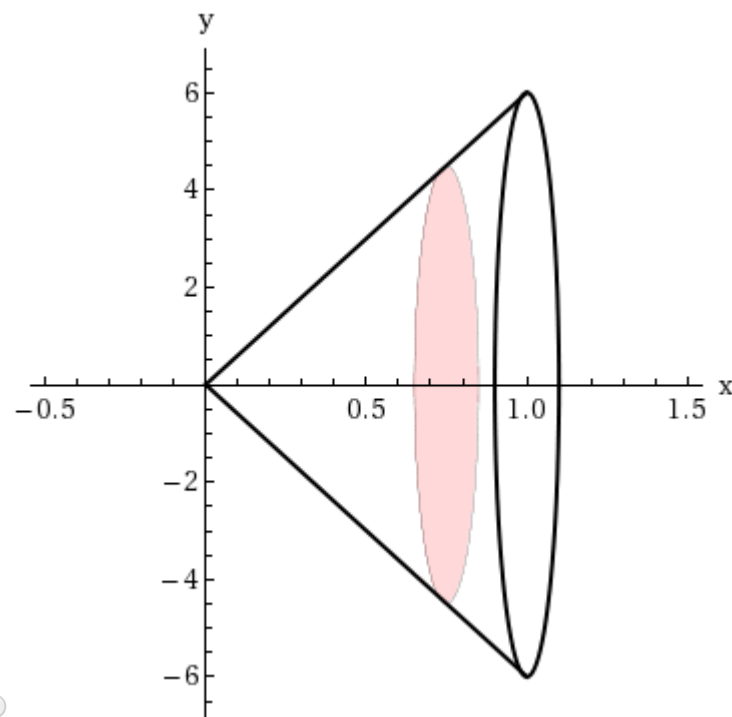
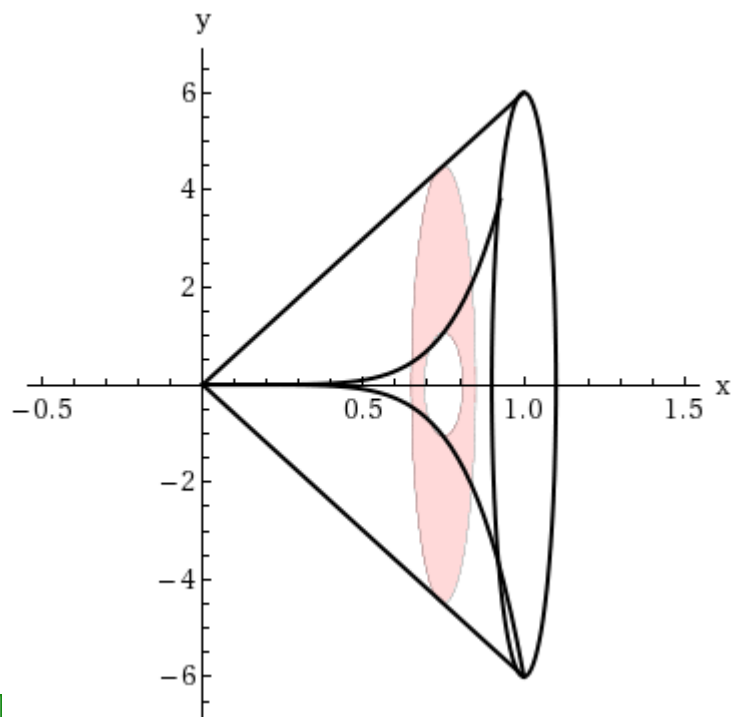
Sketch the region.





Sketch the solid, and a typical disk or washer.



**Step 2**

The inner radius of the washer is $r_1 =$

6x



6x⁶

and the outer radius is $r_2 =$

6x



6x.

Step 3

The cross-sectional area of the washer is

$$A = 36\pi$$

\$\$x^2

✓ $x^2 - x^{12}$.

Step 4

$$(x, y) =$$

\$\$1,6

The two curves intersect at the origin and at the point ✓ $(1, 6)$.

Step 5

Now we can say that the volume of the solid created by rotating the shaded area around the x-axis is

$$V = \int_a^b A(x) dx = \int_0^1 36\pi (x^2 - x^{12}) dx.$$

✓

Step 6

So, the volume of our solid is

$$36\pi \left[\frac{x^3}{3} - \frac{x^{13}}{13} \right]_0^1 =$$

$$\frac{120\pi}{13}$$

$$\frac{120\pi}{13}$$

You have now completed the Master It.

5. **3/3 points** Previous Answers SCalcET8 6.2.013.[My Notes](#)[Ask Your Teacher](#)

Find the volume V of the solid obtained by rotating the region bounded by the given curves about the specified line.

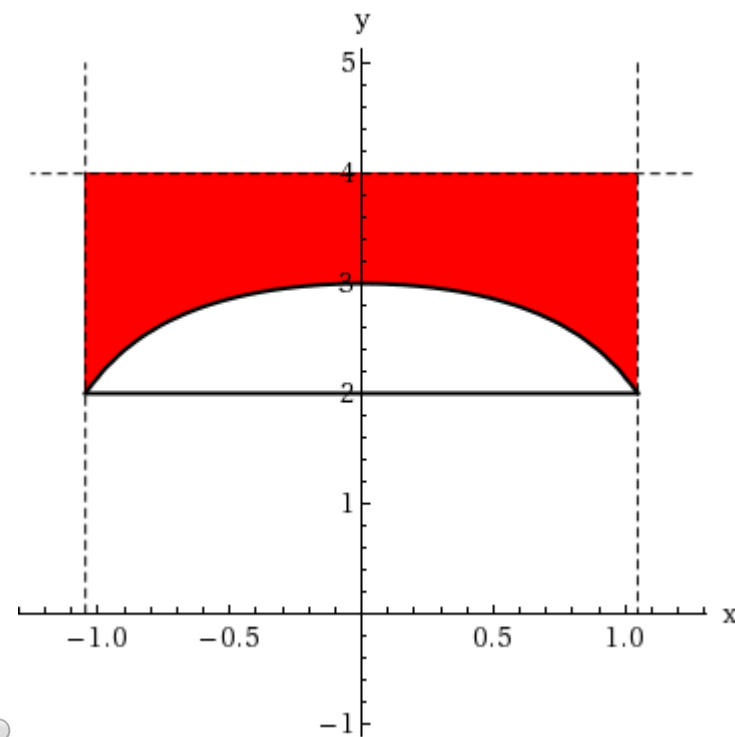
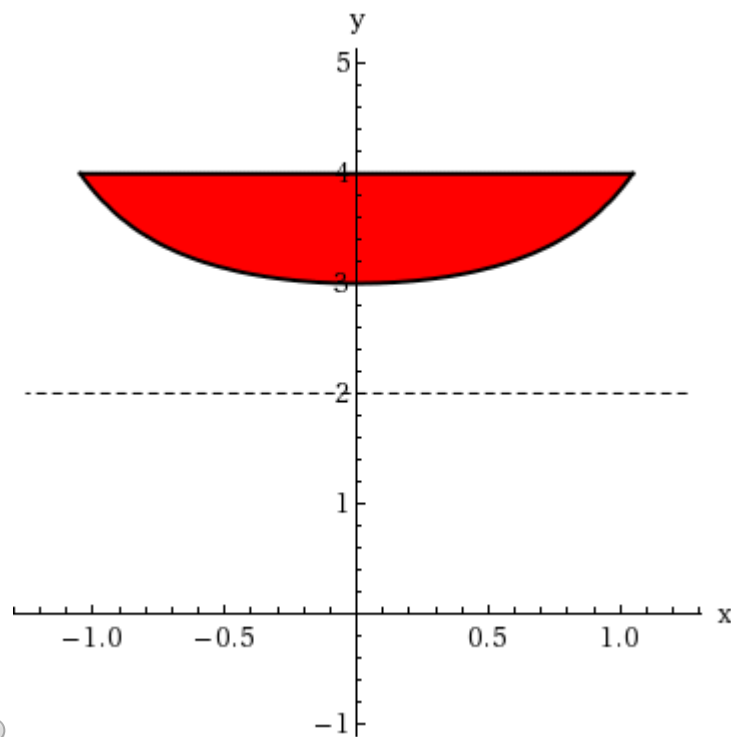
$$y = 2 + \sec(x), \quad -\frac{\pi}{3} \leq x \leq \frac{\pi}{3}, \quad y = 4; \quad \text{about } y = 2$$

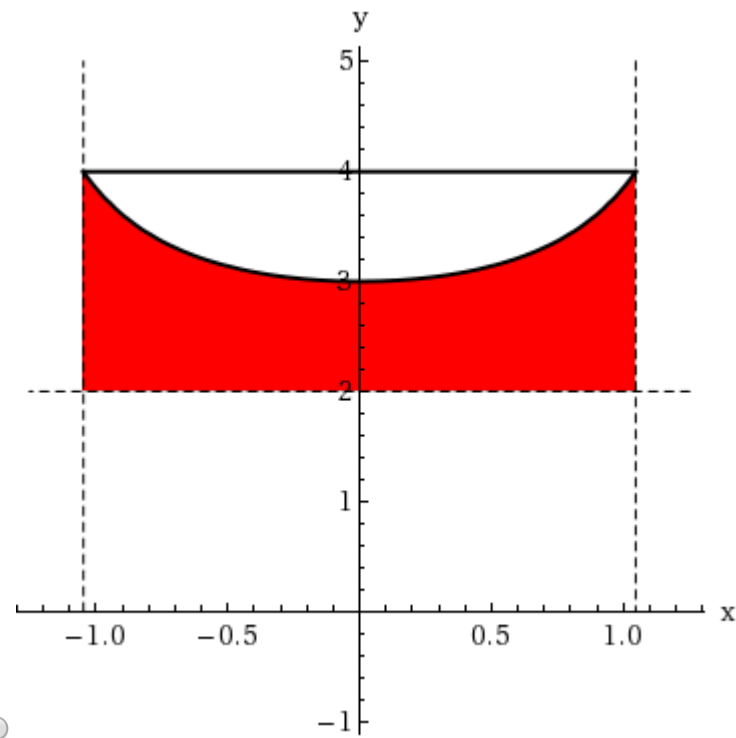
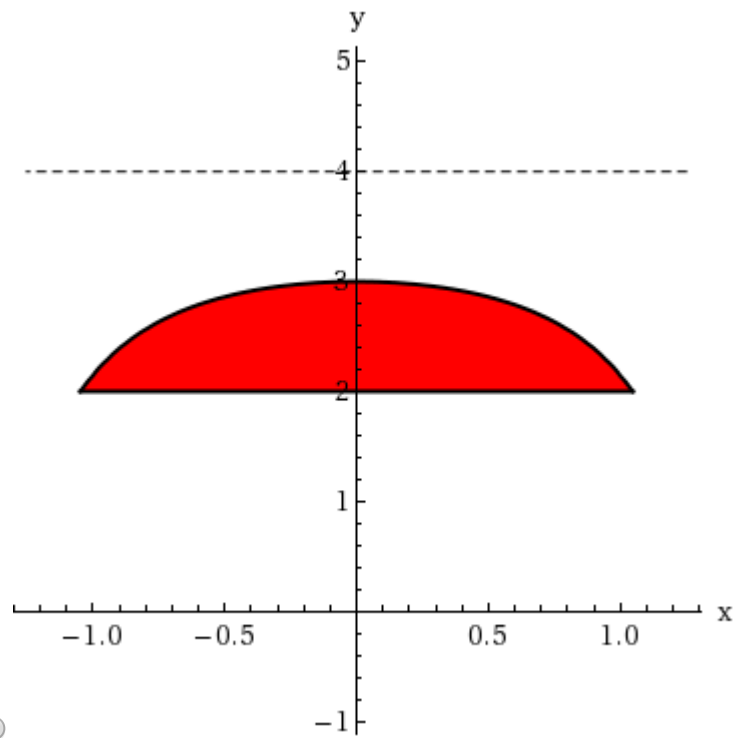
$V =$

 $2\pi(4\pi - \sqrt{3})$

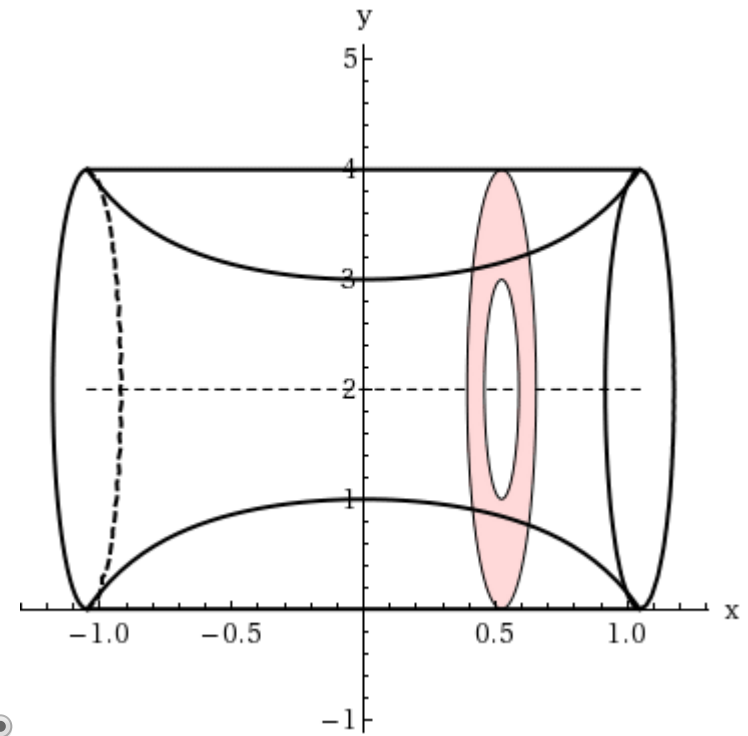
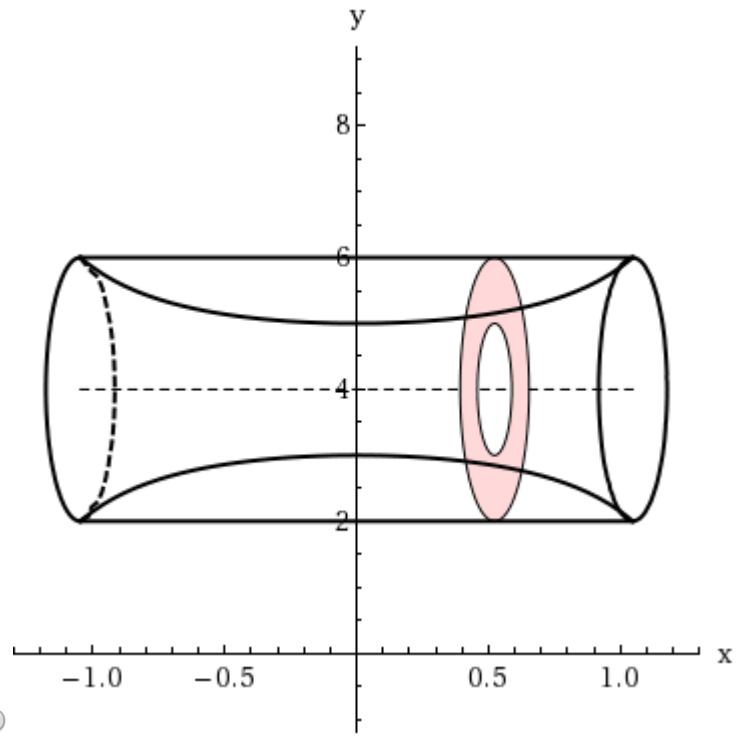


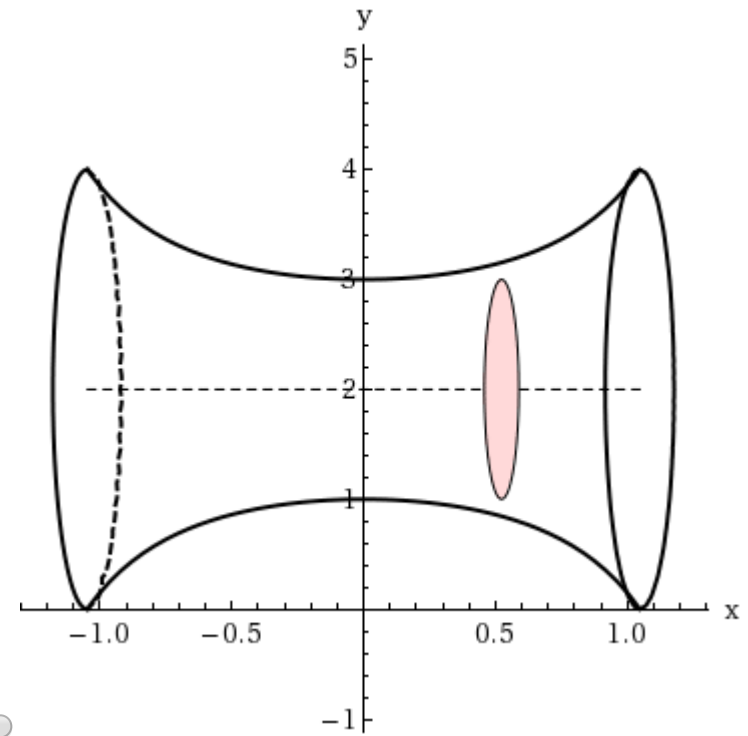
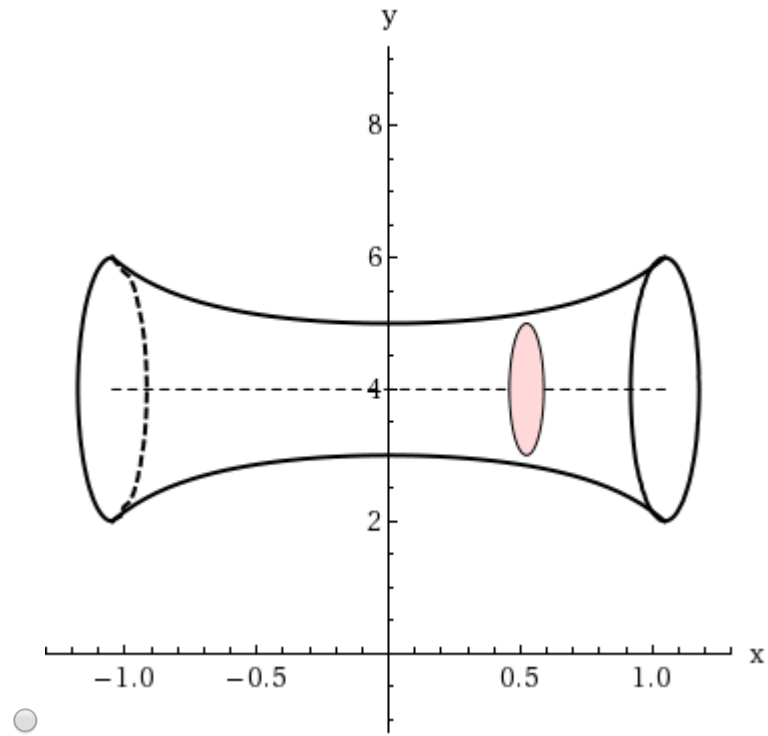
Sketch the region.





Sketch the solid, and a typical disk or washer.





6. **3/3 points** Previous Answers SCalcET8 6.3.005.MI.[My Notes](#)[Ask Your Teacher](#)

Use the method of cylindrical shells to find the volume V generated by rotating the region bounded by the given curves about the y -axis.

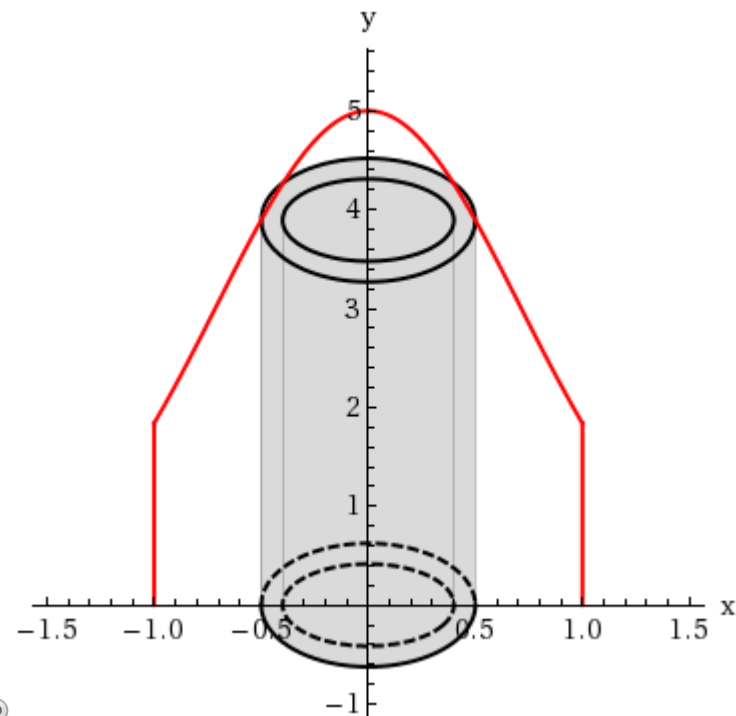
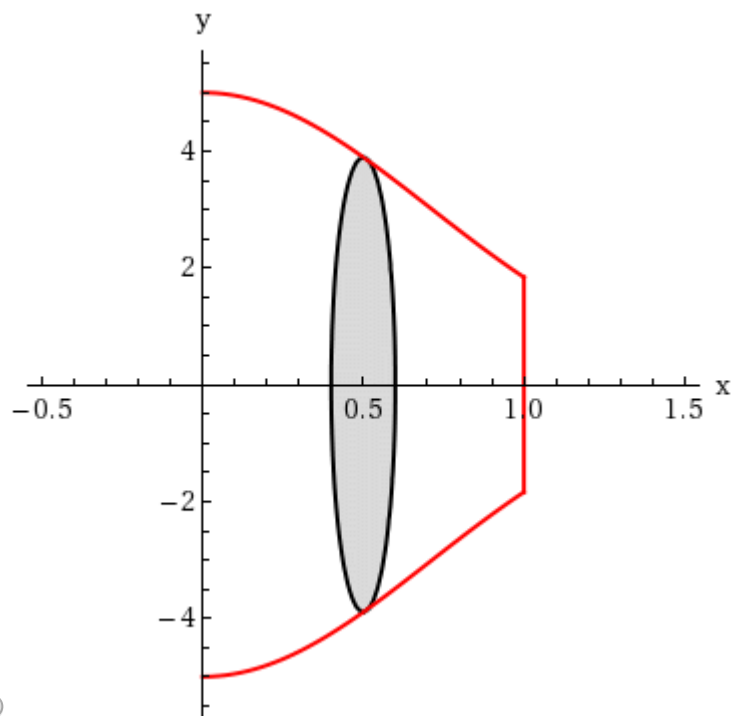
$$y = 5e^{-x^2}, \quad y = 0, \quad x = 0, \quad x = 1$$

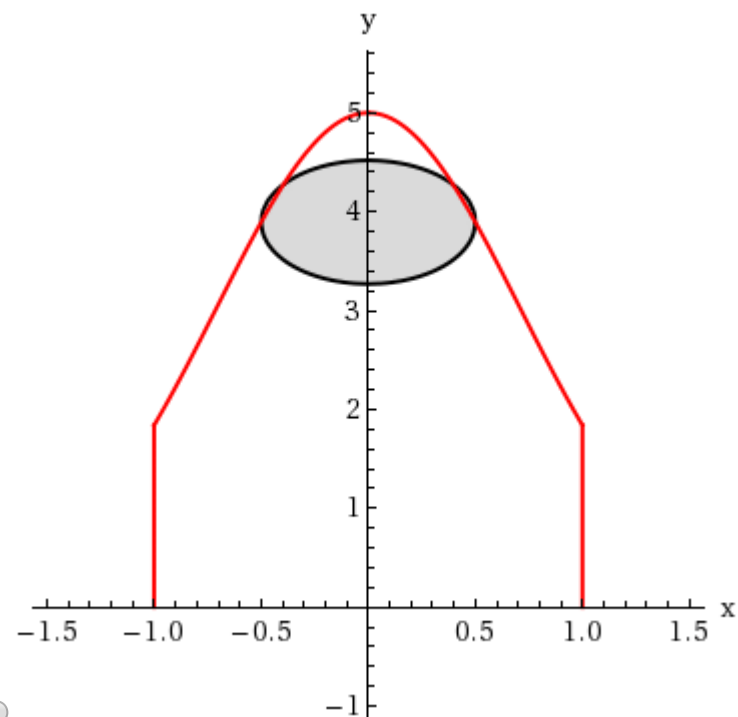
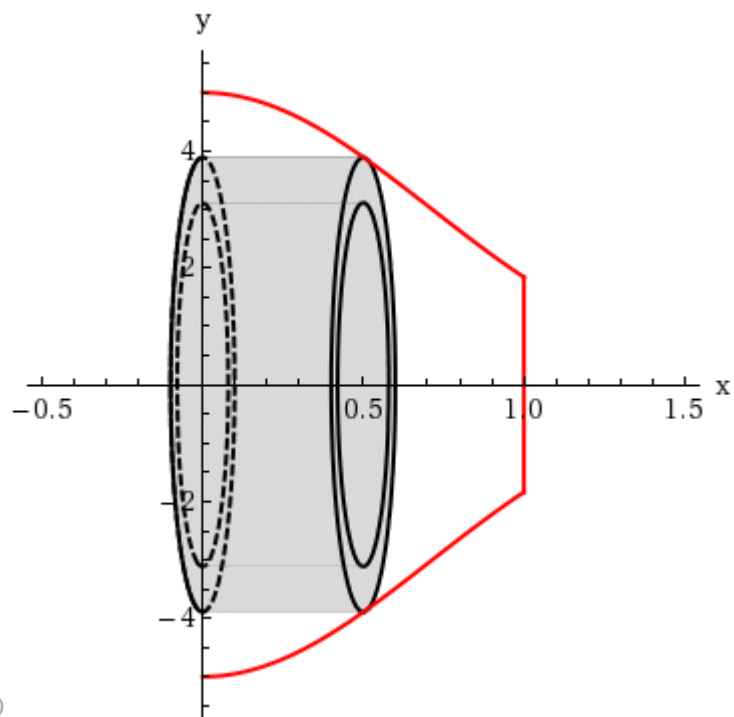
 $V =$

 $-5\pi(e-1-1)$



Sketch the region and a typical shell.





7. **3/3 points** [Previous Answers](#) SCalcET8 6.3.005.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

Use the method of cylindrical shells to find the volume V generated by rotating the region bounded by the given curves about the y -axis.

$$y = 12e^{-x^2}, \quad y = 0, \quad x = 0, \quad x = 1$$

Sketch the region and a typical shell.

Step 1

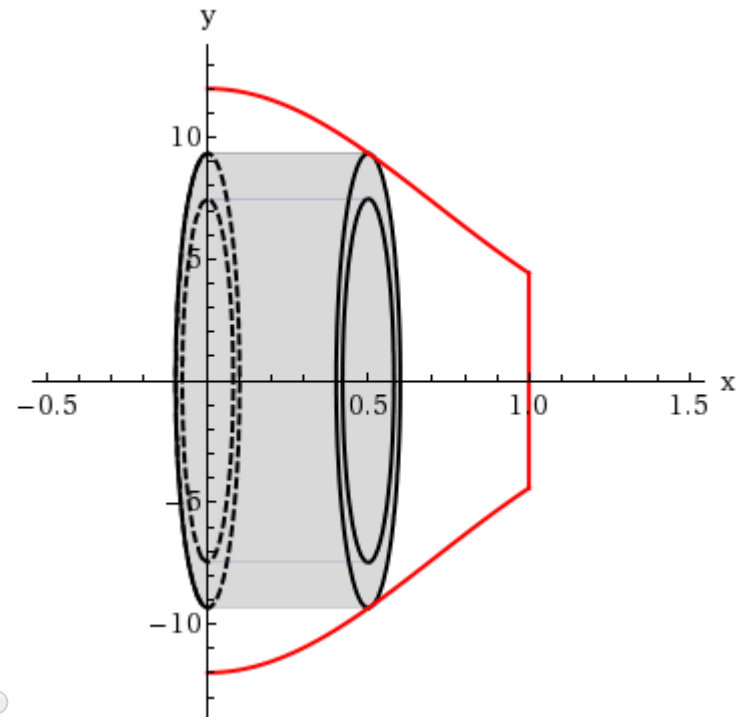
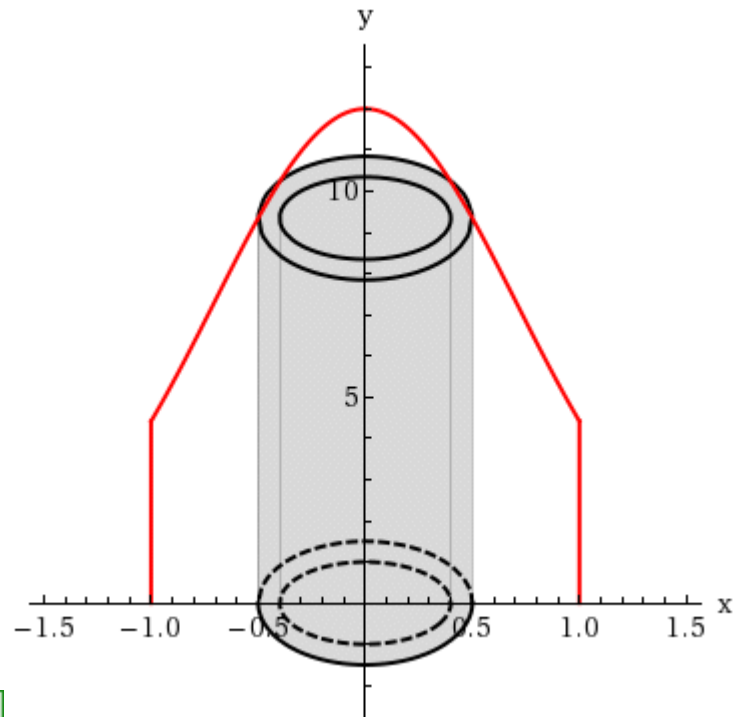
Rotating a vertical strip around the y -axis creates a cylinder with radius $r =$

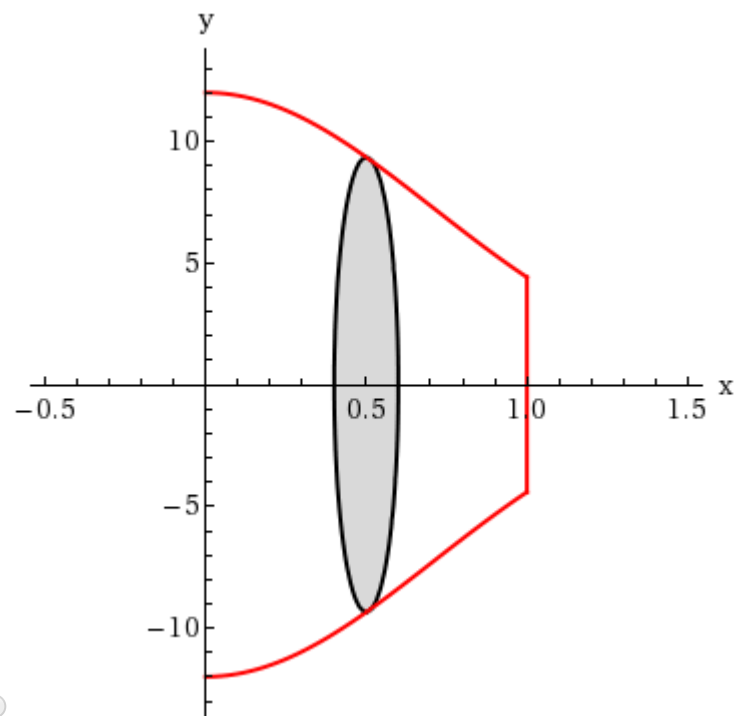
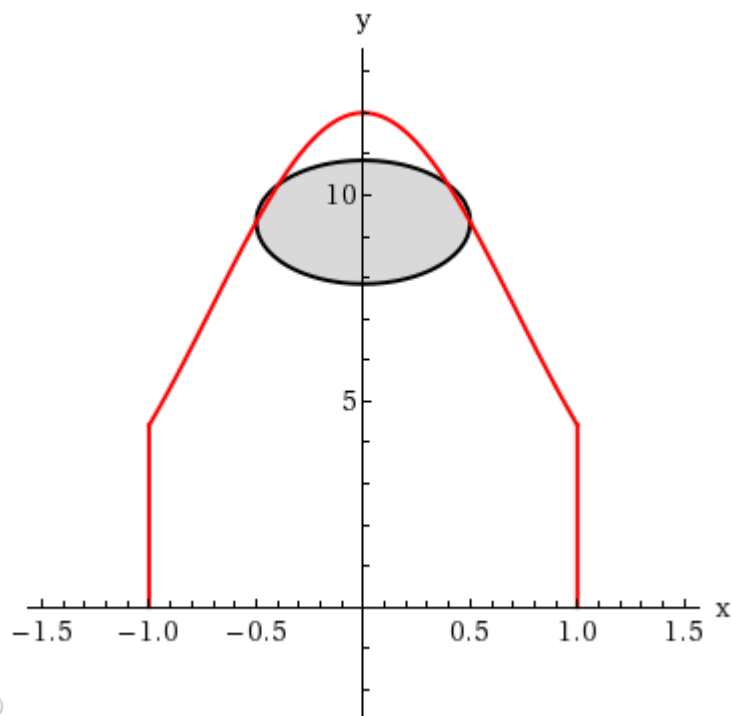
x

✓ x and height $h =$

$12e^{-x^2}$

✓ $12e^{-x^2}$. Sketch the region and a typical shell.





Step 2

Now we can say that the volume of the solid created by rotating the region under $y = 12e^{-x^2}$ and above the x-axis between $x = 0$ and $x = 1$ around the y-axis is

$$V = \int_a^b 2\pi rh \, dx$$

$$= \int_0^1 2\pi x (12e^{-x^2}) \, dx.$$

Step 3

The integral $2\pi \int 12xe^{-x^2} \, dx$ can be done with the substitution $u = -x^2$

✓ $-x^2$ and $du =$
 $-2x$

✓ $-2x$ dx .

Step 4

$$2\pi \int 12xe^{-x^2} dx = -$$

12π

With the substitution, we have ✓ $12\pi \int e^u du = -$

$12\pi e^u$

✓ $12\pi e^u + C$.

Step 5

$$\left[-12\pi e^{-x^2} \right]$$

✓ $12\pi e^{-x^2} \Big|_0^1 =$
 $-12\pi(e-1-1)$

$$12 \left(1 - \frac{1}{e} \right) \pi$$

Going back to x , the volume of our solid is ✓ $12 \left(1 - \frac{1}{e} \right) \pi$.
 You have now completed the Master It.

8. **3/3 points** [Previous Answers](#) SCalcET8 6.3.007.[My Notes](#)[Ask Your Teacher](#)

Use the method of cylindrical shells to find the volume generated by rotating the region bounded by the given curves about the y -axis.

$$y = 3x^2, \quad y = 18x - 6x^2$$

 24π**Need Help?**[Watch It](#)[Talk to a Tutor](#)9. **3/3 points** [Previous Answers](#) SCalcET8 6.3.019.[My Notes](#)[Ask Your Teacher](#)

Use the method of cylindrical shells to find the volume V generated by rotating the region bounded by the given curves about the specified axis.

$$x = 4y^2, \quad y \geq 0, \quad x = 4; \quad \text{about } y = 2$$

 $V =$ 263π**Need Help?**[Talk to a Tutor](#)

10.

3/3 points Previous Answers SCalcET8 6.3.029. My Notes[Ask Your Teacher](#)

The integral represents the volume of a solid. Describe the solid.

$$\int_0^3 2\pi x^8 dx$$

- ☐ The solid is obtained by rotating the region $0 \leq y \leq x^8$, $0 \leq x \leq 3$ about the x -axis using cylindrical shells.
- ☐ The solid is obtained by rotating the region $0 \leq y \leq x^7$, $0 \leq x \leq 3$ about the x -axis using cylindrical shells.
- ☐ The solid is obtained by rotating the region $0 \leq y \leq x^8$, $0 \leq x \leq 3$ about the y -axis using cylindrical shells.
- ☒ The solid is obtained by rotating the region $0 \leq y \leq x^7$, $0 \leq x \leq 3$ about the y -axis using cylindrical shells.
- ☐ The solid is obtained by rotating the region $0 \leq y \leq 2\pi$, $0 \leq x^8 \leq 3$ about the y -axis using cylindrical shells.

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