CENGAGE | WEBASSIGN

davidcorzo@ufm.edu (sign out)

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← **MC 006, section B, Fall 2019**

🎓 INSTRUCTOR

Christiaan Ketelaar
Universidad Francisco Marroquin

Problemas Práctica Examen Final (Homework)

Current Score

QUESTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
POINTS	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0	–/0
	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐	⭐

TOTAL SCORE

–/0	0.0%

Due Date

DECEMBER 21
11:59 PM CST

📅 Request Extension

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.   **–/0 points**   **SCalcET8 7.4.033.**   🗅 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_0^1 \frac{x^3 + 3x}{x^4 + 6x^2 + 3} \, dx$$

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2.   **–/0 points**   **SCalcET8 7.4.002.**   📝 **My Notes**   **Ask Your Teacher**

Write out the form of the partial fraction decomposition of the function (as in this [example](#)). Do not determine the numerical values of the coefficients.

(a) $\dfrac{x - 20}{x^2 + x - 20}$

[   ]

[   ]

(b) $\dfrac{x^2}{x^2 + x + 20}$

[   ]

[   ]

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3.   **–/0 points**   **SCalcET8 7.4.004.**   📝 **My Notes**   **Ask Your Teacher**

Write out the form of the partial fraction decomposition of the function (as in this example). Do not determine the numerical values of the coefficients.

(a) $\dfrac{x^4 - 2x^3 + x^2 + 5x - 4}{x^2 - 2x + 1}$

[ ]

[ ]

(b) $\dfrac{x^2 - 1}{x^3 + x^2 + x}$

[ ]

[ ]

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4.   **–/0 points**   **SCalcET8 7.4.009.**   📝 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Remember to use absolute values where appropriate. Use C for the constant of integration.)

$$\int \frac{26x + 4}{(5x + 1)(x - 1)}\, dx$$

[ ]

[ ]

5.   **–/0 points**   **SCalcET8 7.4.012.**   ⎘ **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_0^1 \frac{x - 6}{x^2 - 6x + 8}\, dx$$

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6.   **–/0 points**   **SCalcET8 7.4.014.**   ⎘ **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Assume $a \neq b$. Remember to use absolute values where appropriate. Use C for the constant of integration.)

$$\int \frac{7}{(x + a)(x + b)}\, dx$$

7.   **–/0 points**   **SCalcET8 7.4.017.**   ◪ My Notes   Ask Your Teacher

Evaluate the integral.

$$\int_1^2 \frac{4y^2 - 7y - 12}{y(y + 2)(y - 3)} \, dy$$

8.   **–/0 points**   **SCalcET8 7.4.023.MI.**   ◪ My Notes   Ask Your Teacher

Evaluate the integral. (Remember to use absolute values where appropriate. Use C for the constant of integration.)

$$\int \frac{5}{(x - 1)(x^2 + 4)} \, dx$$

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9.   **–/0 points**   **SCalcET8 7.4.024.**   🗍 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Remember to use absolute values where appropriate. Use C for the constant of integration.)

$$\int \frac{x^2 - x + 12}{x^3 + 2x}\, dx$$

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10.   **–/0 points**   **SCalcET8 7.4.023.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

Evaluate the integral.

$$\int \frac{82}{(x - 1)(x^2 + 81)}\, dx$$

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11.   **–/0 points**   **SCalcET8 5.4.011.**   ⧉ **My Notes**   **Ask Your Teacher**

Find the general indefinite integral. (Use C for the constant of integration. Remember to use absolute values where appropriate.)

$$\int \frac{9 + \sqrt{x} + x}{x} \, dx$$

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12.   **–/0 points**   **SCalcET8 5.4.016.**   ⧉ **My Notes**   **Ask Your Teacher**

Find the general indefinite integral. (Use C for the constant of integration.)

$$\int \sec(t)(5\sec(t) + 4\tan(t)) \, dt$$

| 13. | –/0 points | SCalcET8 5.4.027. | 📄 My Notes | Ask Your Teacher |

Evaluate the integral.

$$\int_0^{\pi} (7e^x + 7\sin(x))\,dx$$

[ ]

[ ]

| 14. | –/0 points | SCalcET8 5.4.037. | 📄 My Notes | Ask Your Teacher |

Evaluate the integral.

$$\int_0^{\pi/4} \frac{6 + 7\cos^2(\theta)}{\cos^2(\theta)}\,d\theta$$

[ ]

[ ]

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15. **–/0 points** SCalcET8 5.4.038.MI.   ⟂ **My Notes** **Ask Your Teacher**

Evaluate the integral.

$$\int_0^{\pi/3} \frac{7 \sin(\theta) + 7 \sin(\theta) \tan^2(\theta)}{\sec^2(\theta)} \, d\theta$$

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16.   **−/0 points**   **SCalcET8 5.5.050.**   ▨ **My Notes**   **Ask Your Teacher**

Evaluate the indefinite integral. (Use C for the constant of integration.)

$$\int \tan^6(\theta) \sec^2(\theta) \, d\theta$$

Illustrate and check that your answer is reasonable by graphing both the function and its antiderivative (take $C = 0$).

○

○

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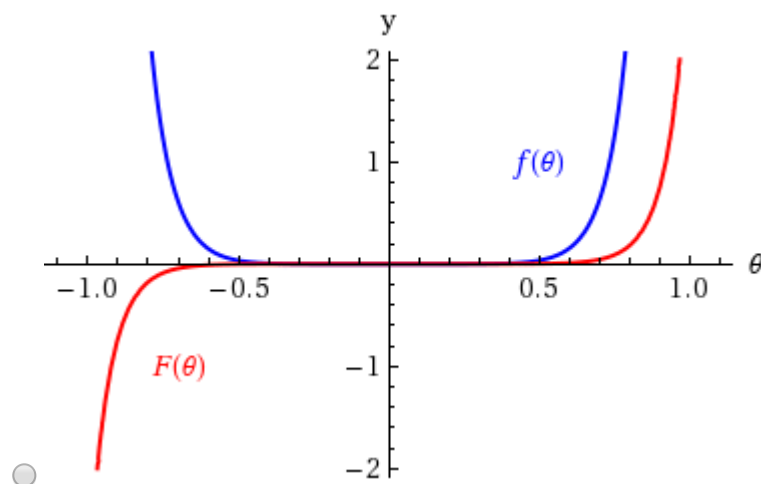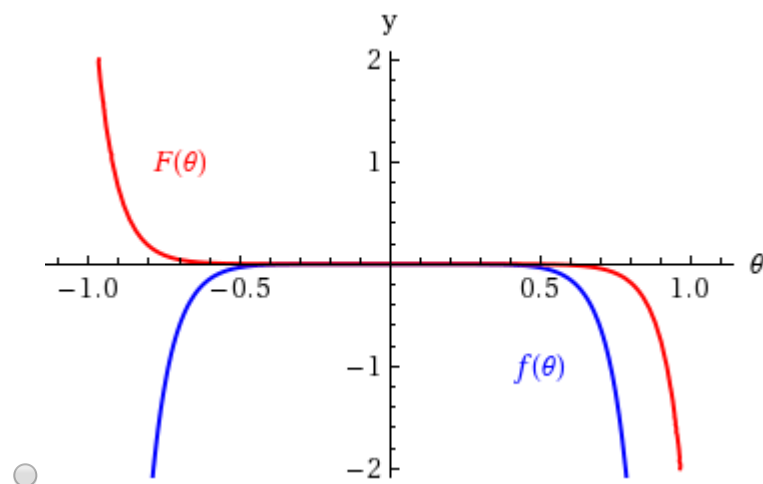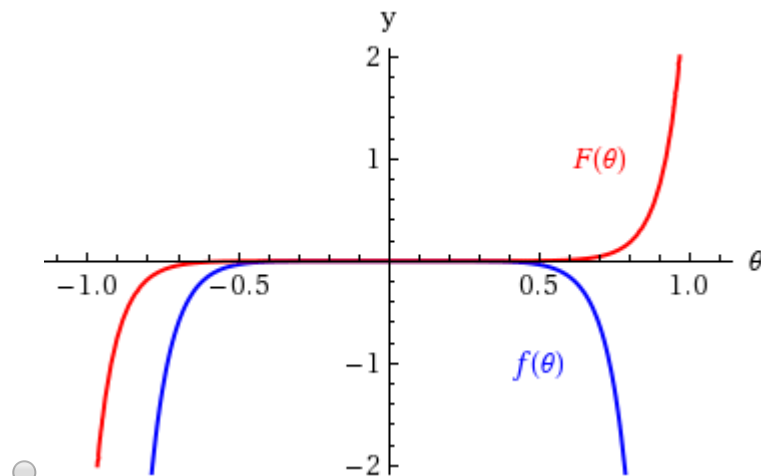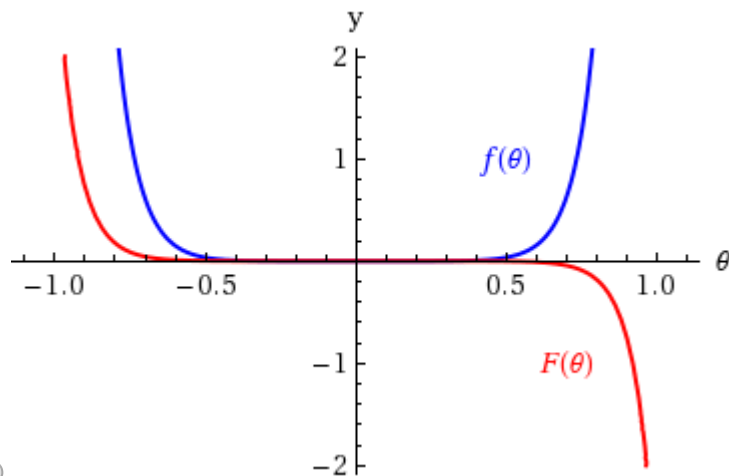
17.   **–/0 points**   **SCalcET8 5.5.059.**   ⬓ **My Notes**   **Ask Your Teacher**

Evaluate the definite integral.

$$\int_{1}^{2} \frac{e^{1/x^3}}{x^4} \, dx$$

[ ]

[ ]

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18.   **–/0 points**   **SCalcET8 5.5.069.**   🔖 **My Notes**   **Ask Your Teacher**

Evaluate the definite integral.

$$\int_{e^{16}}^{e^{36}} \frac{dx}{x\sqrt{\ln(x)}}$$

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19.   **–/0 points**   **SCalcET8 5.5.077.**   🔖 **My Notes**   **Ask Your Teacher**

Evaluate $\int_{-4}^{4} (x + 2)\sqrt{16 - x^2}\, dx$ by writing it as a sum of two integrals and interpreting one of those integrals in terms of an area.

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20.   **–/0 points**   **SCalcET8 5.4.041.**   🔖 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_{0}^{\sqrt{2}/2} \frac{dr}{\sqrt{1 - r^2}}$$

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21.   **–/0 points**   SCalcET8 5.4.049.

The area of the region that lies to the right of the y-axis and to the left of the parabola $x = 8y - y^2$ (the shaded region in the figure) is given

by the integral $\int_0^8 (8y - y^2)\, dy.$ (Turn your head clockwise and think of the region as lying below the curve $x = 8y - y^2$ from $y = 0$ to

$y = 8$.) Find the area of the region.

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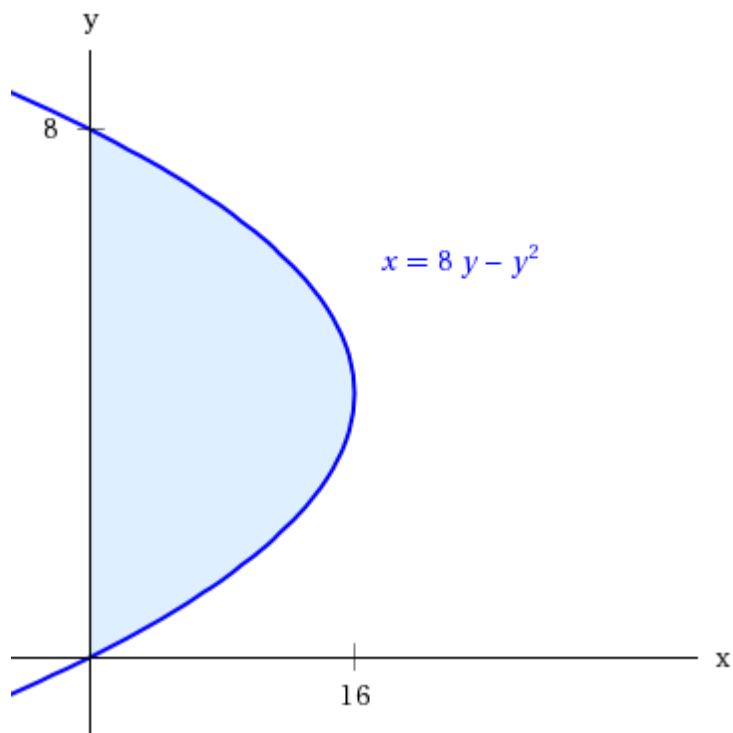
22.   **–/0 points**   SCalcET8 5.4.050.   ⬚ **My Notes**   **Ask Your Teacher**

The boundaries of the shaded region are the y-axis, the line $y = 10$, and the curve $y = 10\sqrt[4]{x}$. Find the area of this region by writing x as a function of y and integrating with respect to y.

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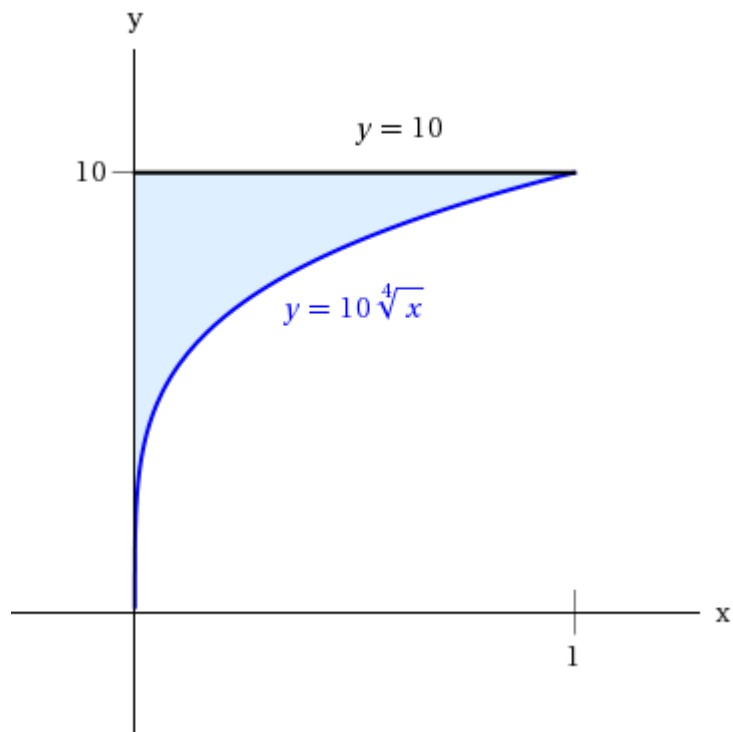
23.   **–/0 points**   SCalcET8 5.5.091.   ⬜ **My Notes**   **Ask Your Teacher**

If a and b are positive numbers, show that

$$\int_0^1 x^a(1-x)^b\,dx = \int_0^1 x^b(1-x)^a\,dx.$$

$u = 1 - x$. Then $x =$

[   ]

Let [   ] and $du =$ [? ▼] .

Use this substitution to rewrite the integral in terms of u.

$$\int_0^1 x^a(1-x)^b\,dx = \int_1^{\boxed{}} \boxed{}\, u^b(-du) = \int_{\boxed{}}^{\boxed{}} u^b(1-u)^a\,du$$

Then replacing u with x results in the integral

$$\int_0^1 \boxed{} (1-x)^a\,dx.$$

24.   **–/0 points**   SCalcET8 5.5.505.XP.MI.   ⬚ **My Notes**   **Ask Your Teacher**

Evaluate the integral by making the given substitution. (Use *C* for the constant of integration.)

$$\int \frac{\sec^2(1/x^7)}{x^8} \, dx, \quad u = 1/x^7$$

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25.   **–/0 points**   SCalcET8 6.1.004.   ⧉ **My Notes**   **Ask Your Teacher**

Find the area of the shaded region.
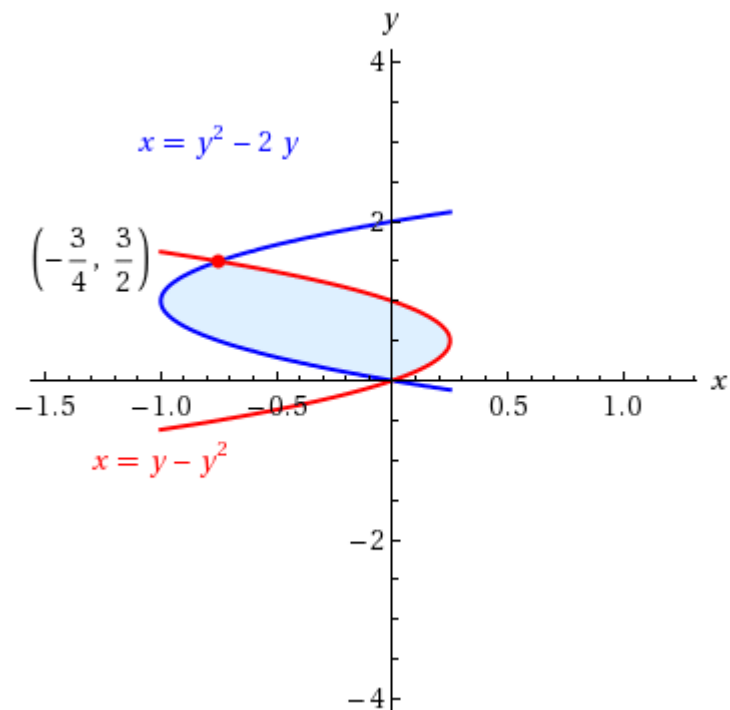
26.   **–/0 points**   SCalcET8 6.1.009.   🗒 **My Notes**   **Ask Your Teacher**

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

$y = 4/x, \quad y = 4/x^2, \quad x = 5$
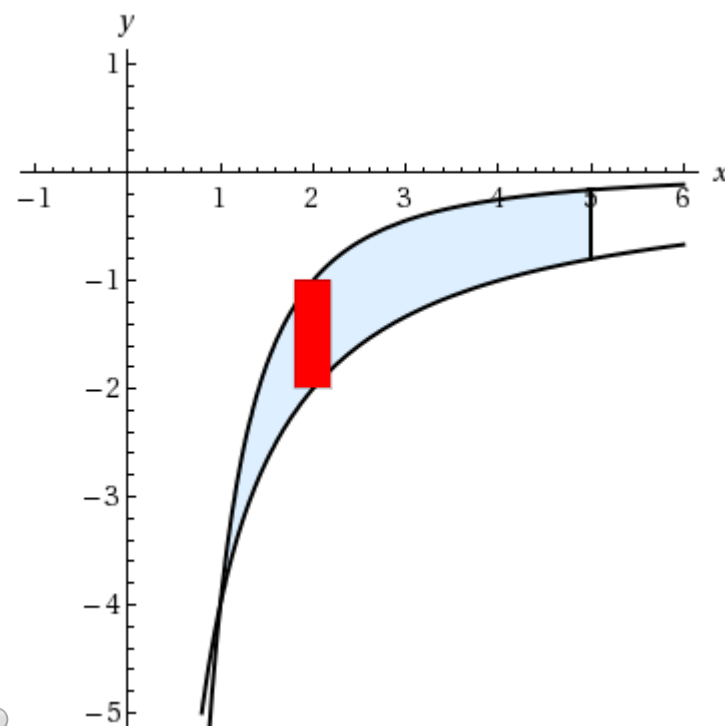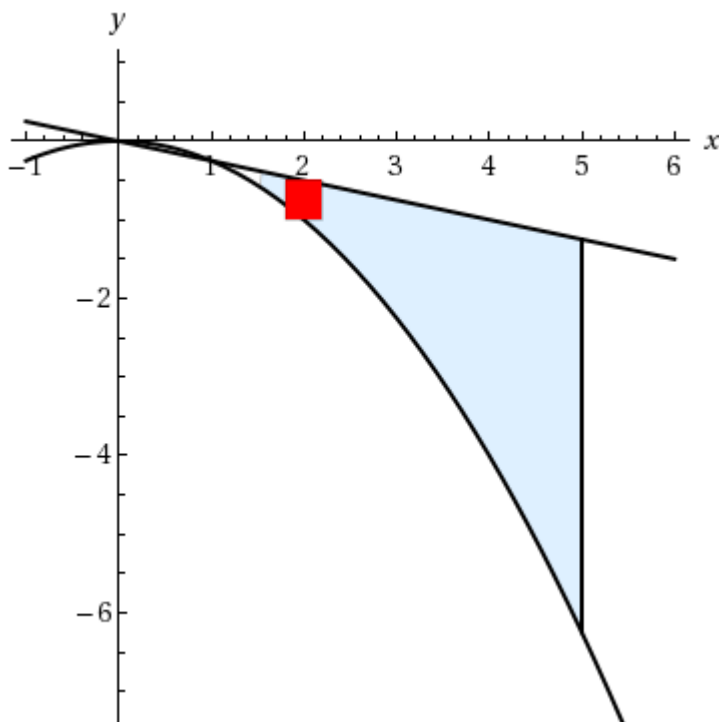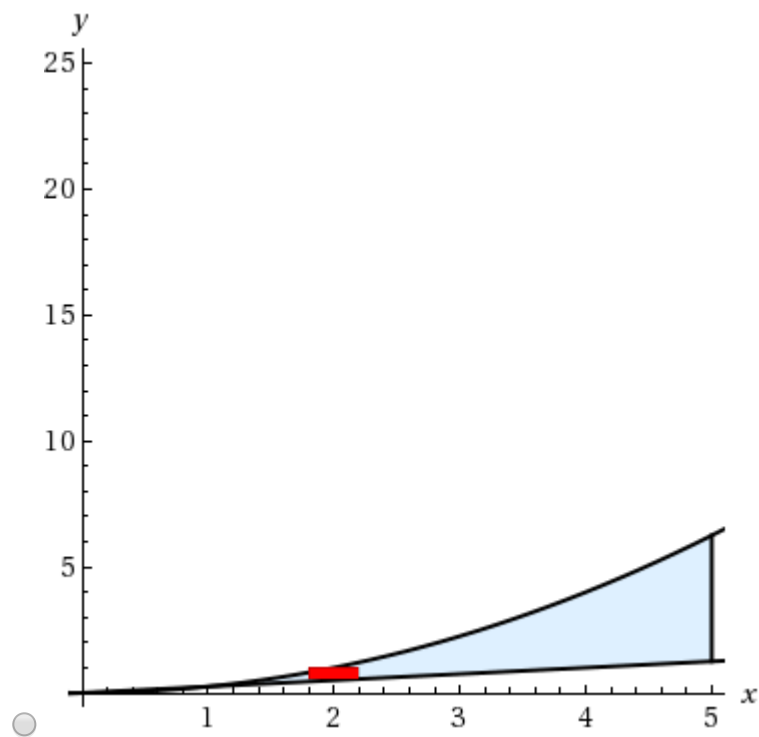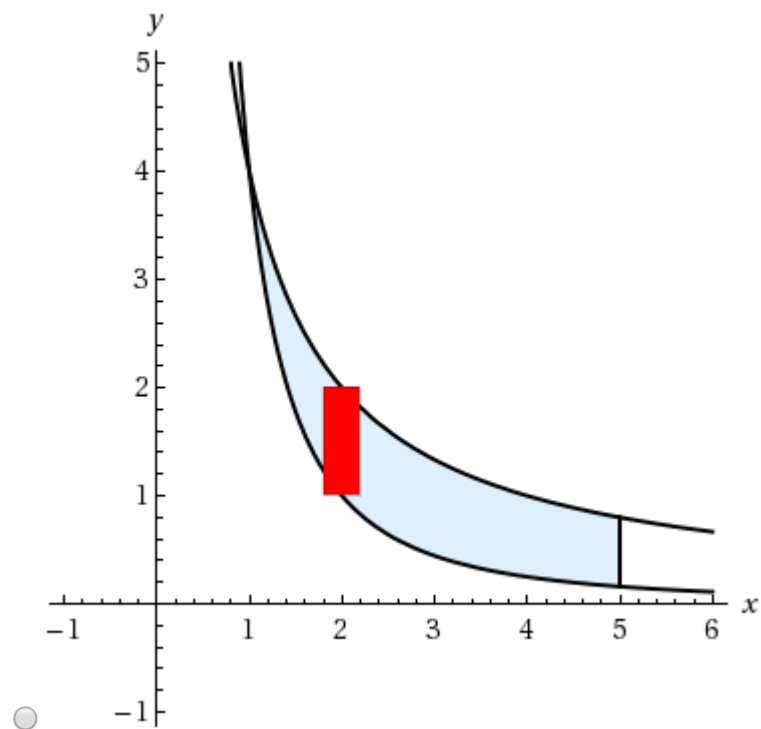
Find the area of the region.

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27.   **–/0 points**   SCalcET8 6.1.012.   ⬚ **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.

$6x + y^2 = 16, \quad x = y$
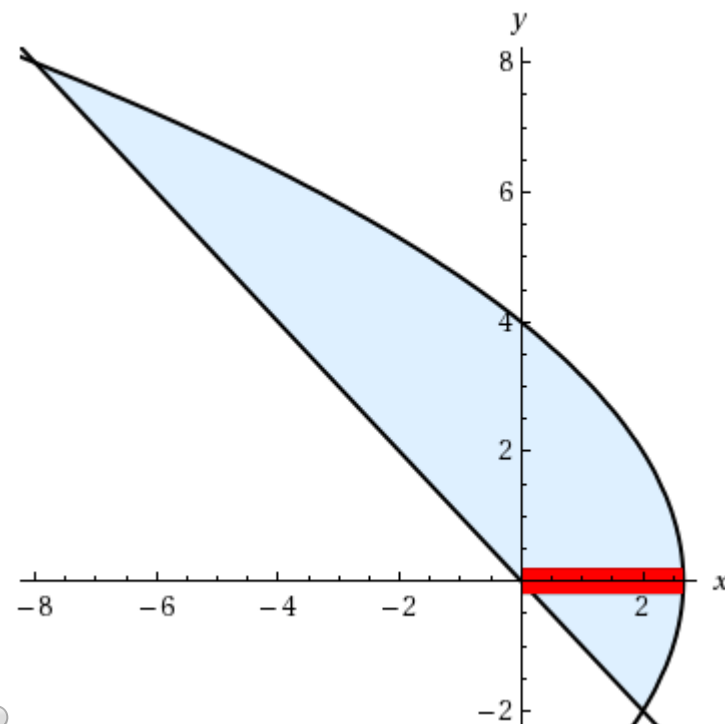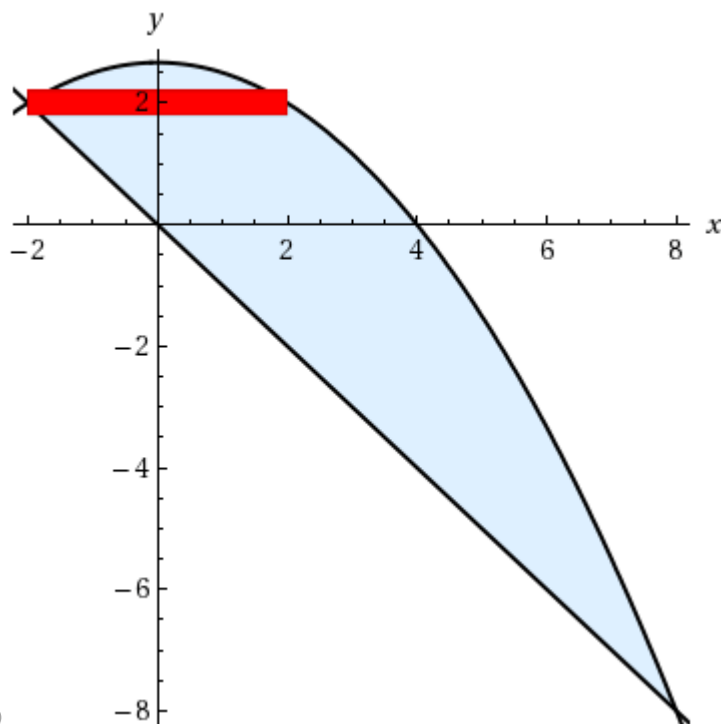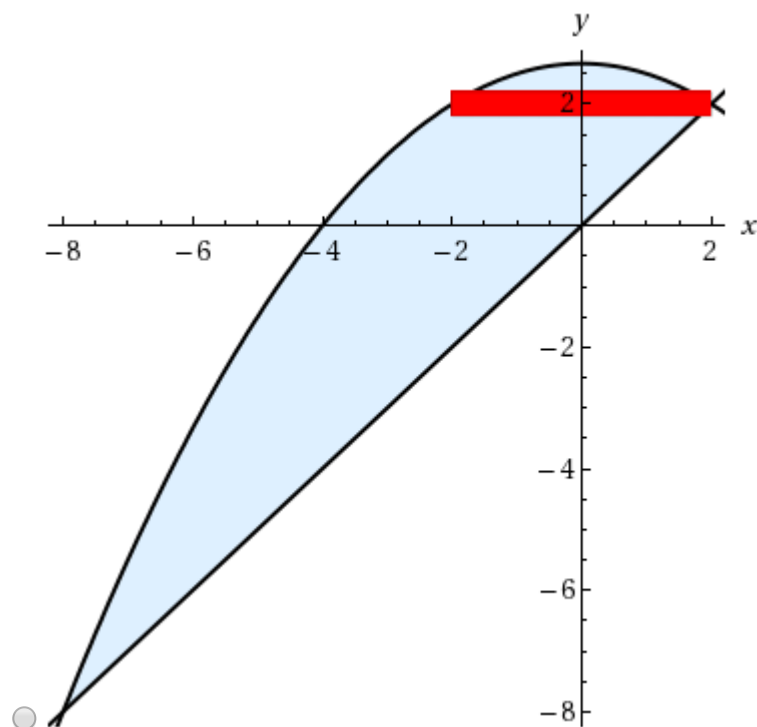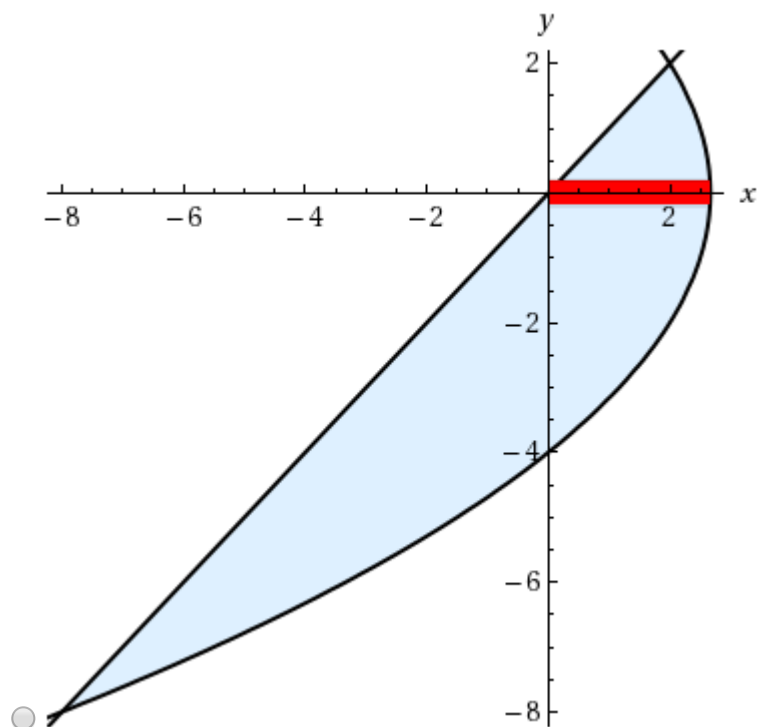
Find the area of the region.

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28.   **–/0 points**   SCalcET8 6.1.019.

Sketch the region enclosed by the given curves.

$$y = 6 \cos(\pi x), \quad y = 12x^2 - 3$$
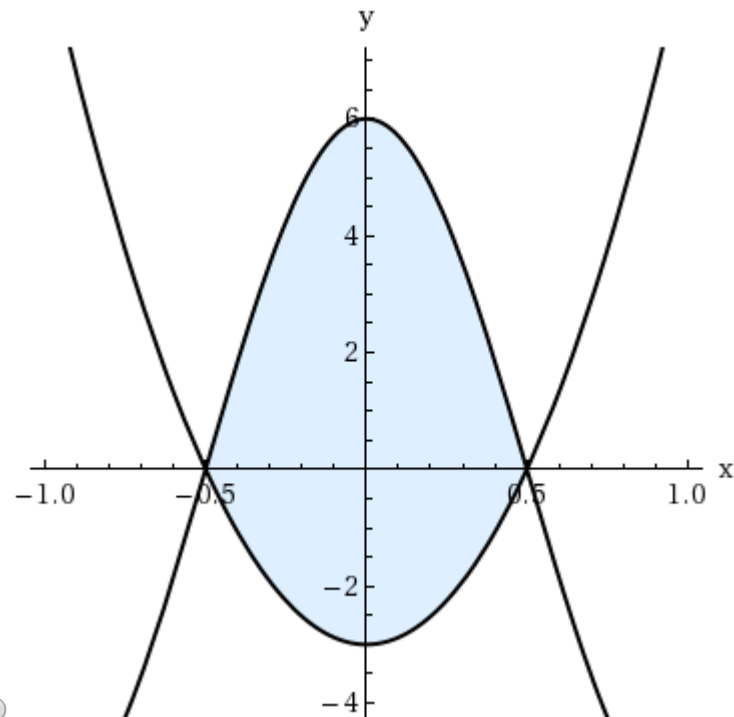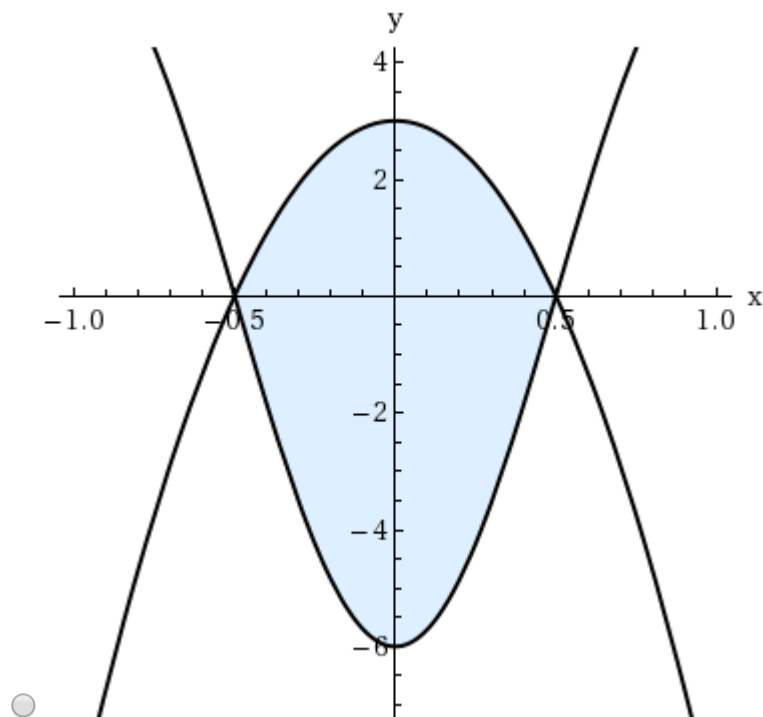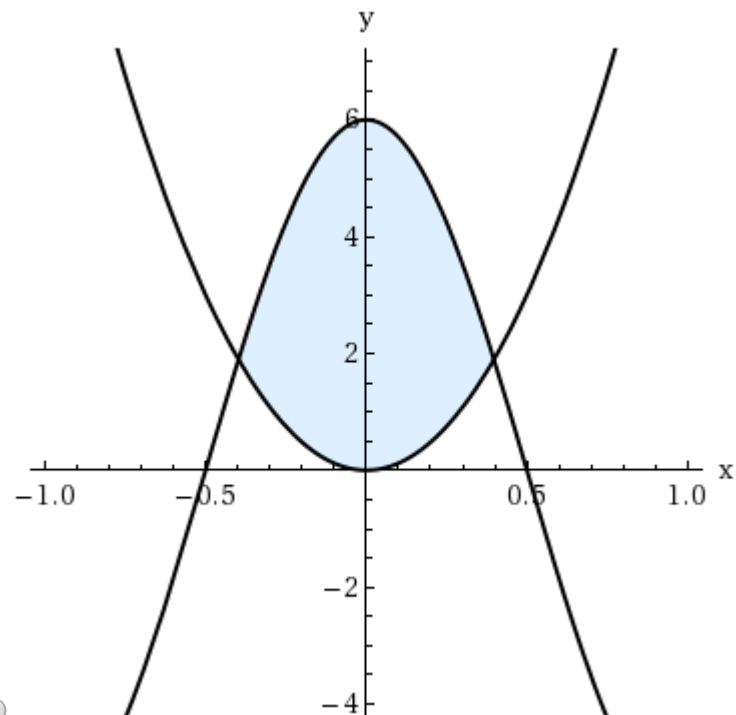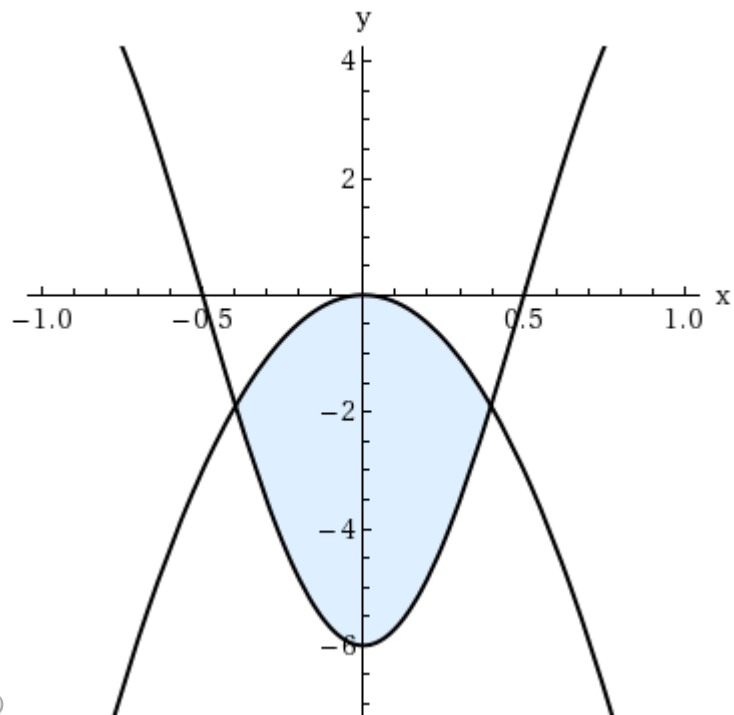
Find its area.

29.   **–/0 points**   SCalcET8 6.1.024.   🗒 **My Notes**   **Ask Your Teacher**

Sketch the region enclosed by the given curves.

$$y = 7\cos(6x), \quad y = 7 - 7\cos(6x), \quad 0 \le x \le \pi/6$$
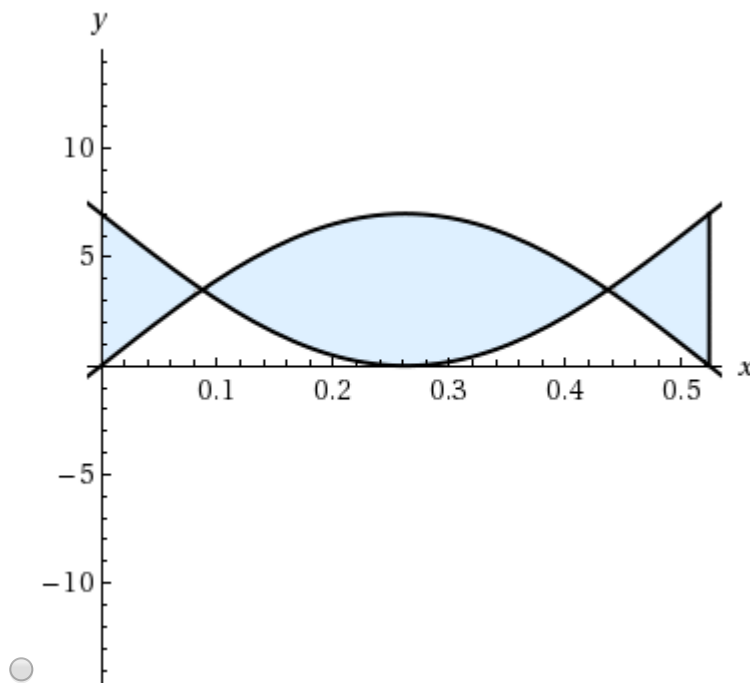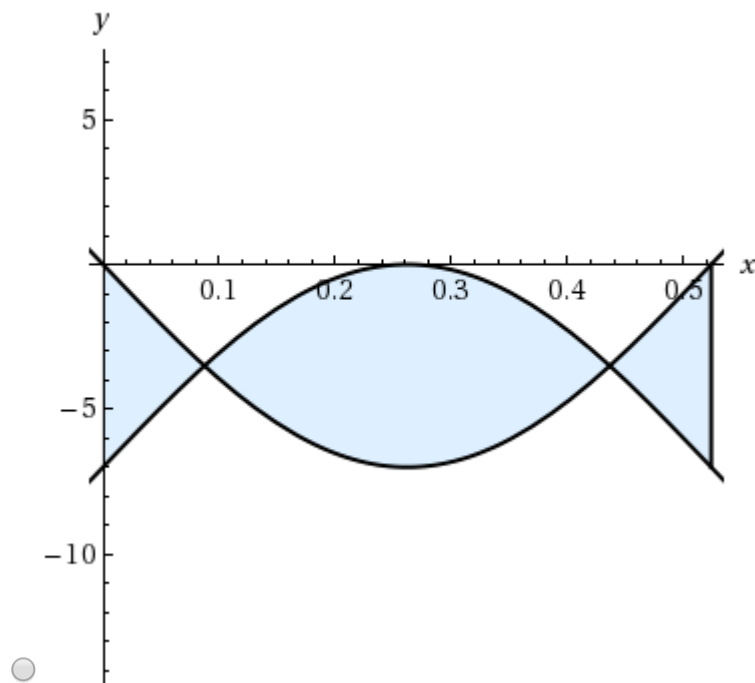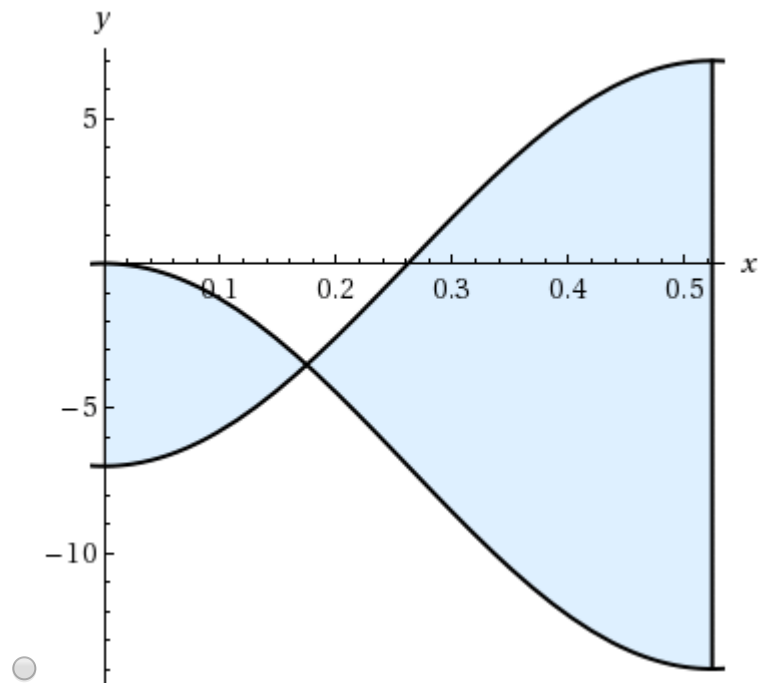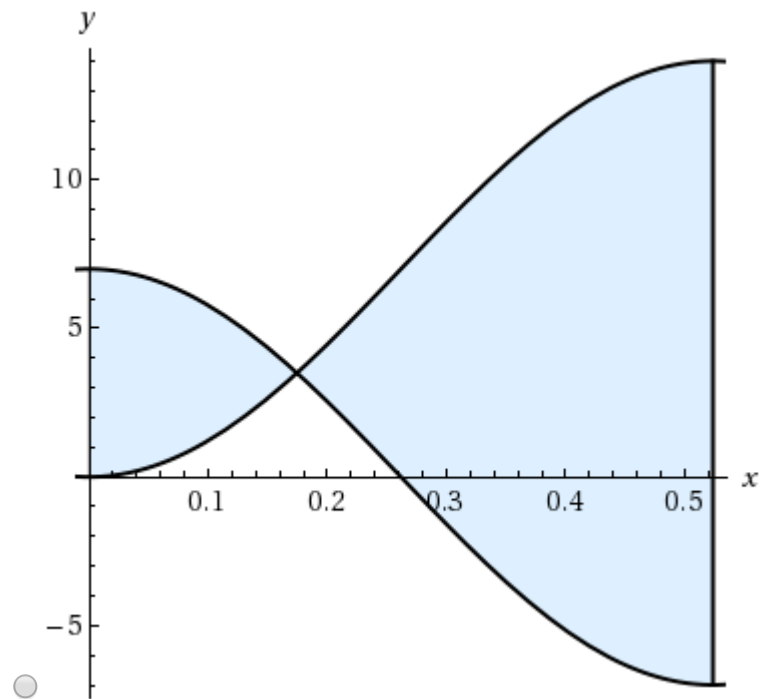
Find its area.

30.   **–/0 points**   **SCalcET8 6.1.027.**

Sketch the region enclosed by the given curves.

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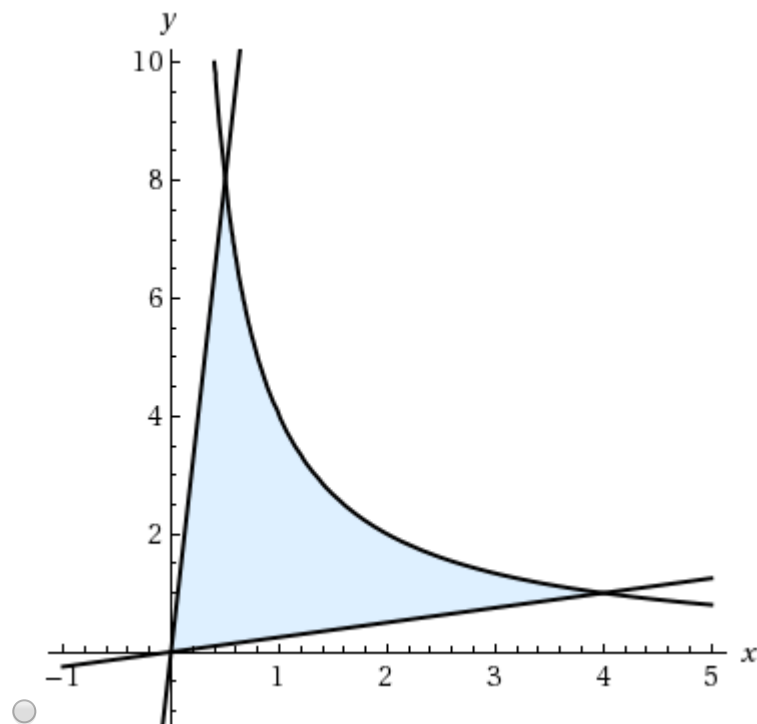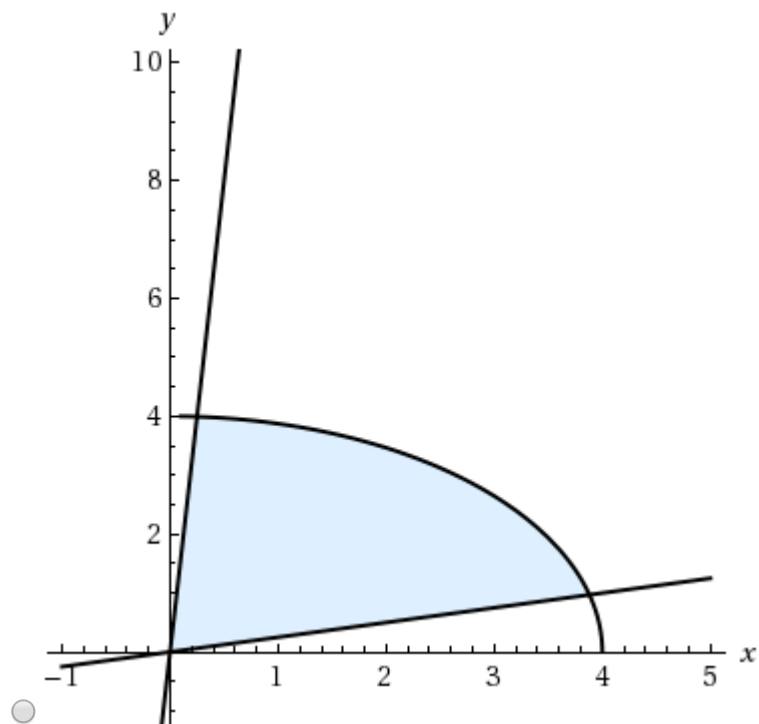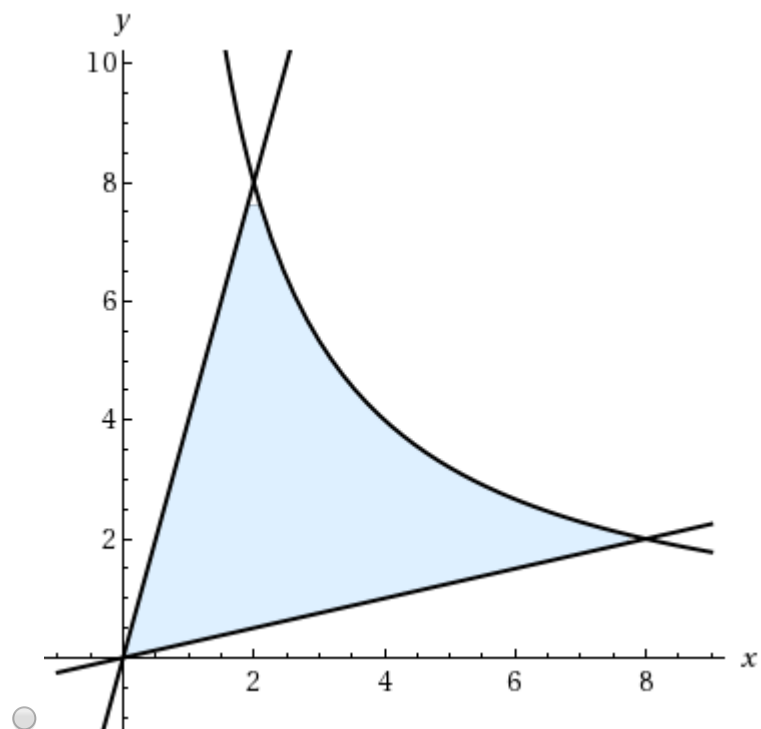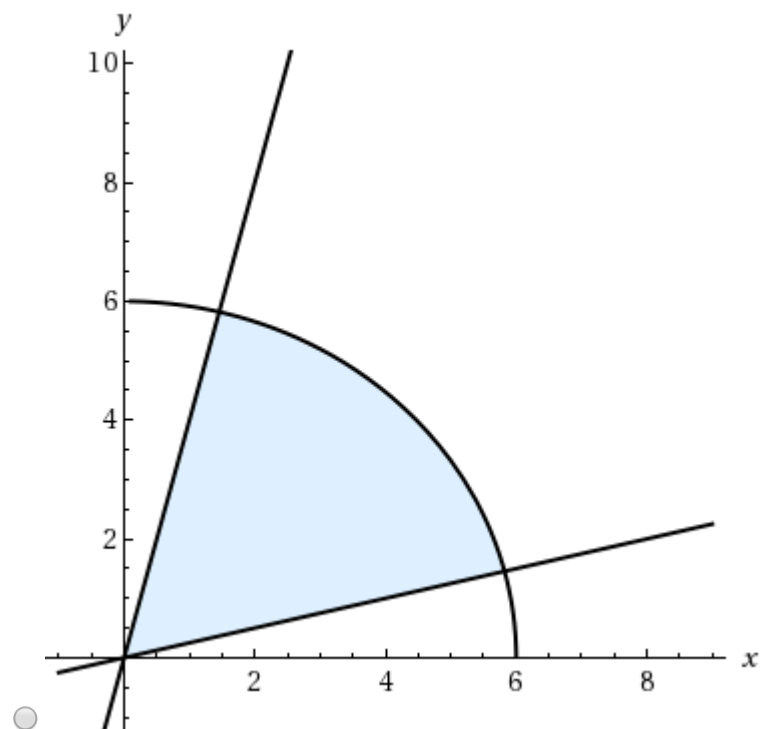
Find its area.

31. **–/0 points**   **SCalcET8 6.1.035.**   ⬚ **My Notes**   **Ask Your Teacher**

Evaluate the integral and interpret it as the area of a region.

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

Sketch the region.
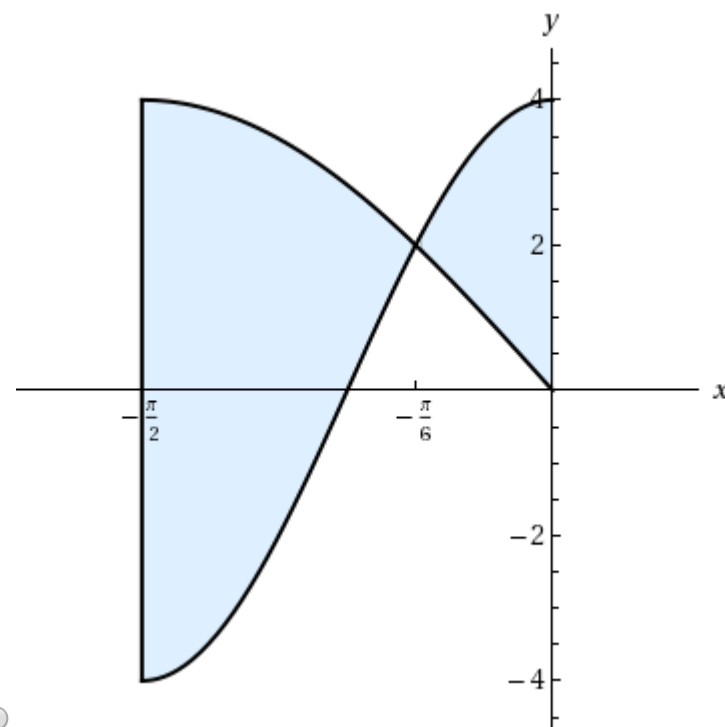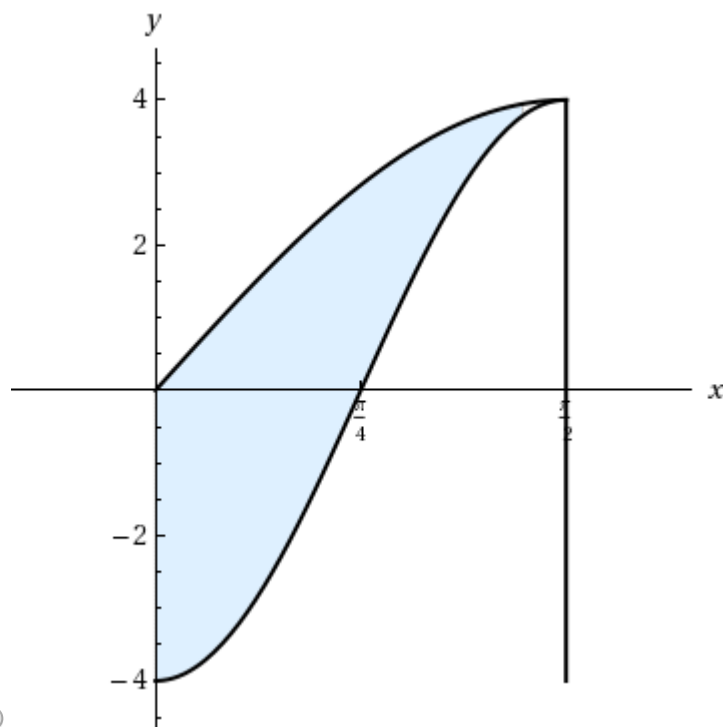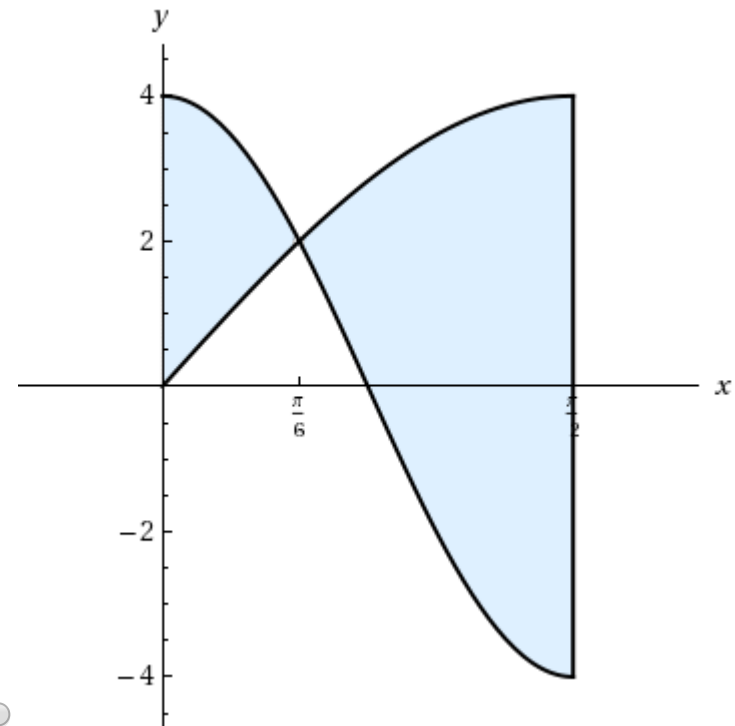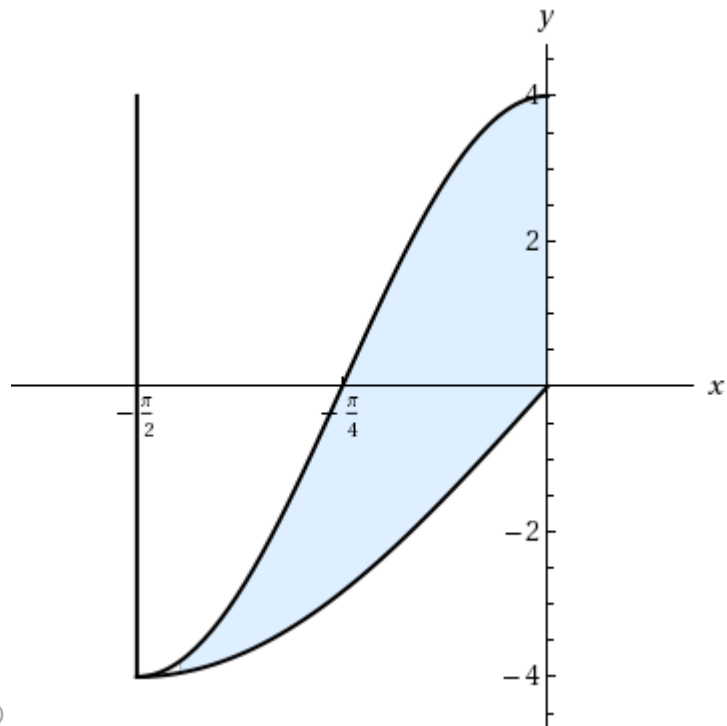
32. **–/0 points** **SCalcET8 6.1.507.XP.**

Sketch the region enclosed by the given curves.

$$y = \sqrt{x}, \quad y = \frac{1}{2}x, \quad x = 9$$
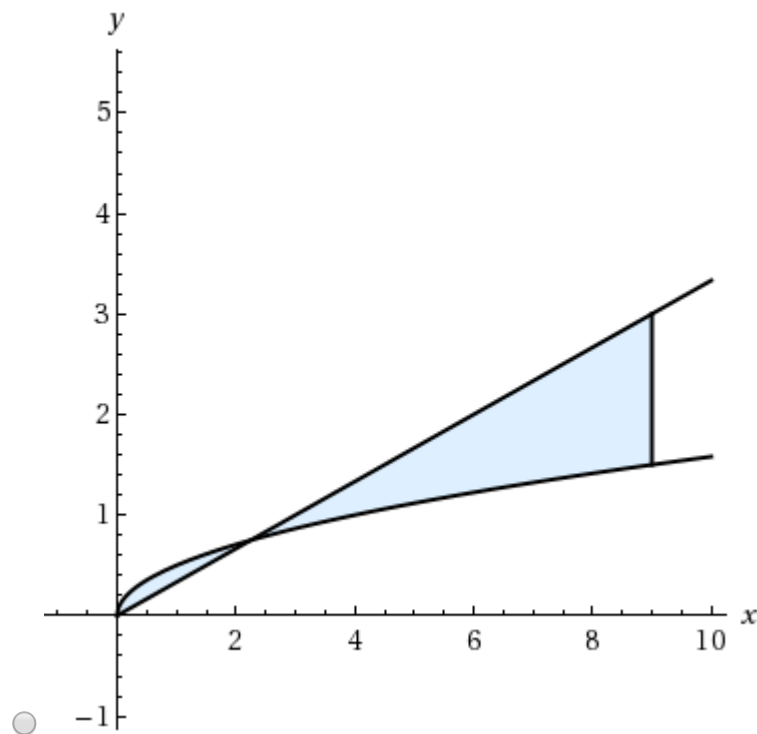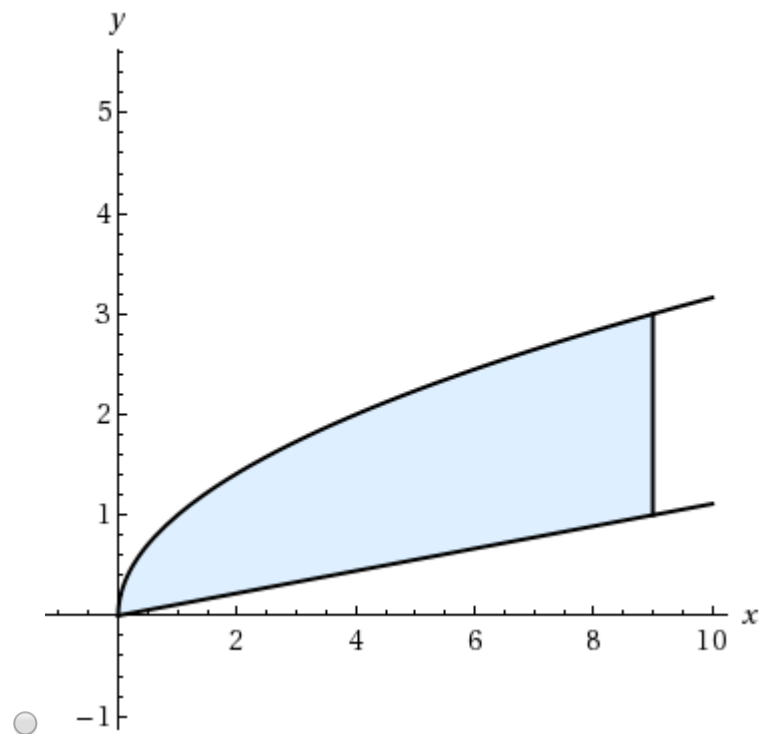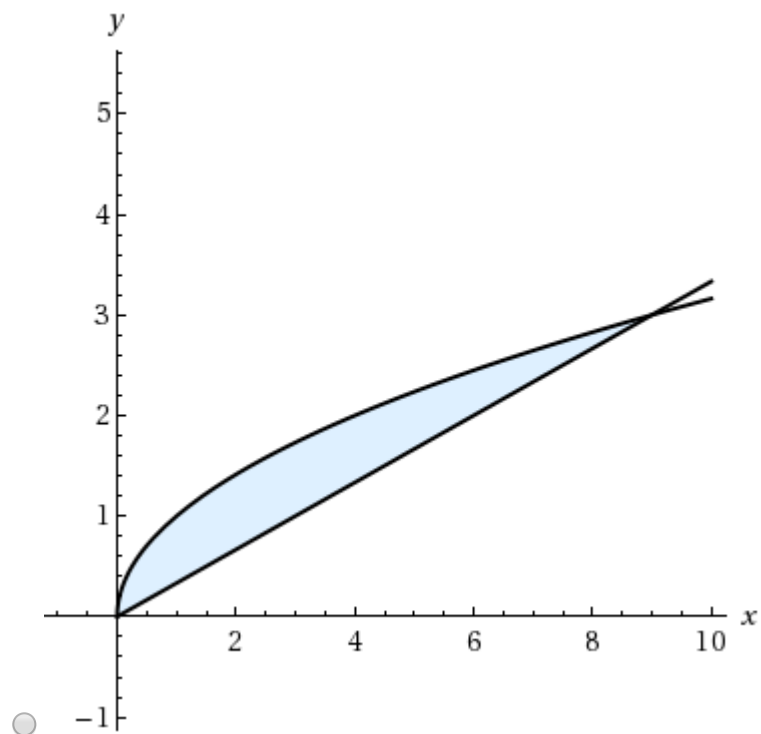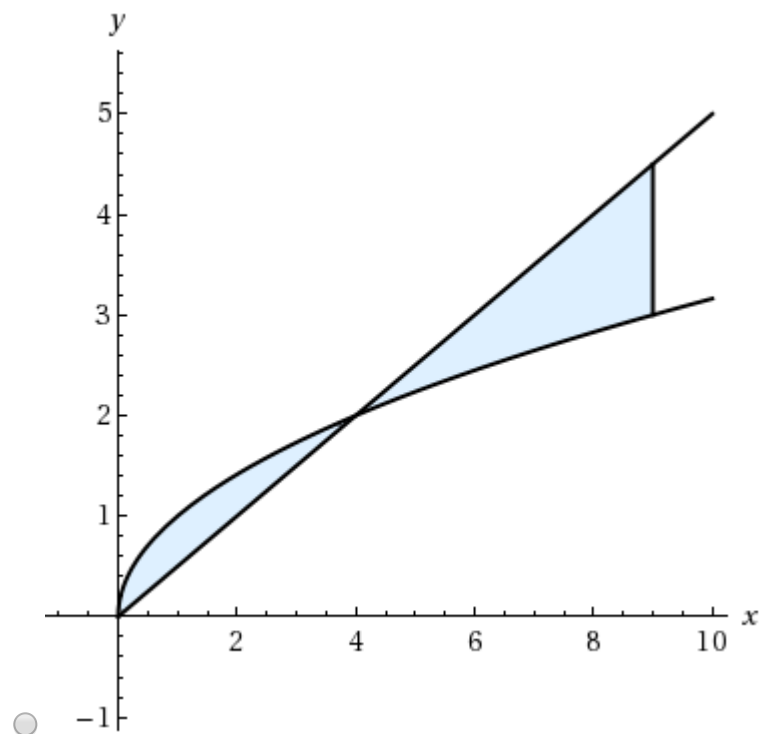
Find its area.

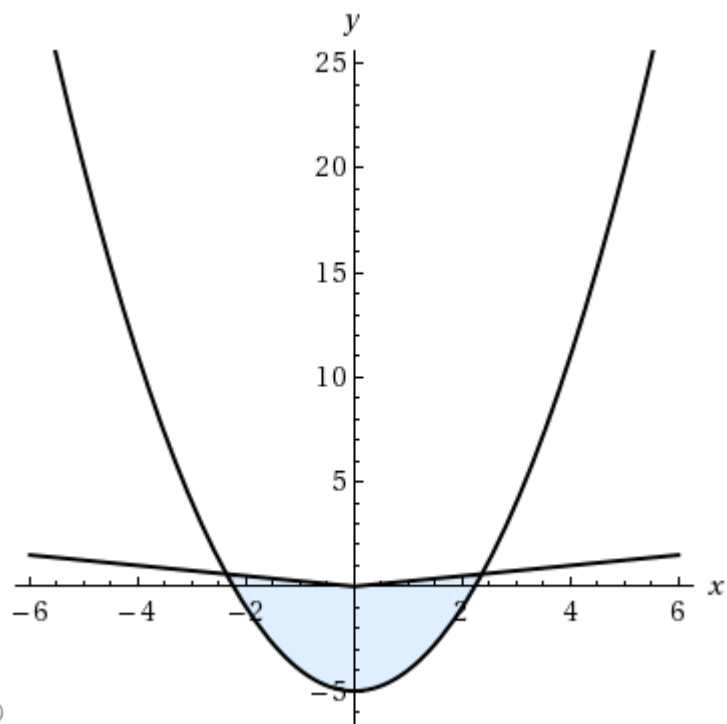--

33.   **–/0 points**   SCalcET8 6.1.508.XP.   ▣ **My Notes**   **Ask Your Teacher**

Sketch the region enclosed by the given curves.

$$y = |4x|, \quad y = x^2 - 5$$
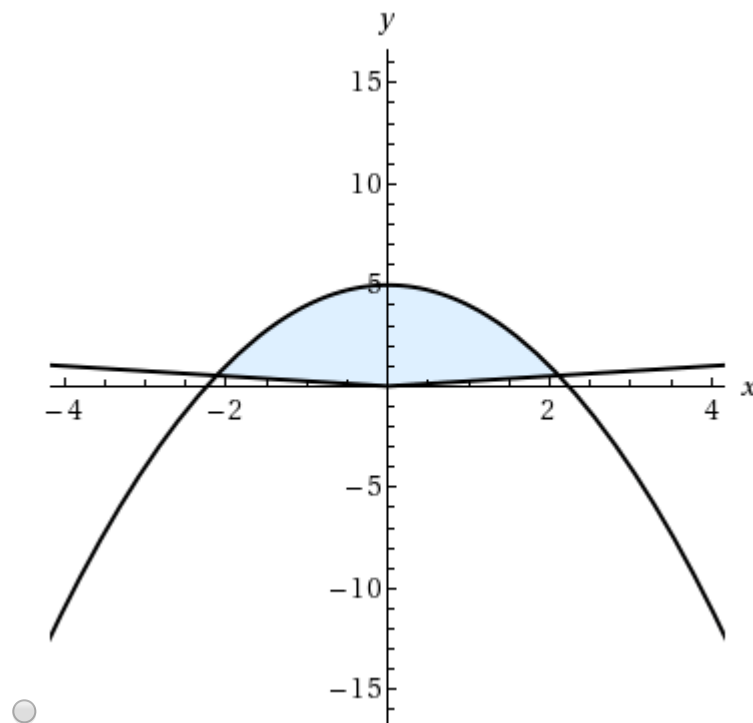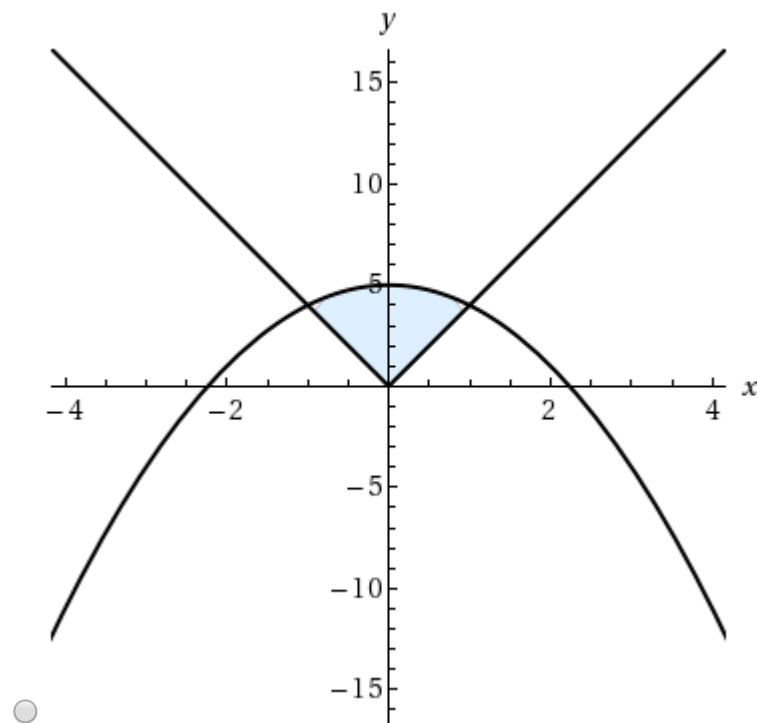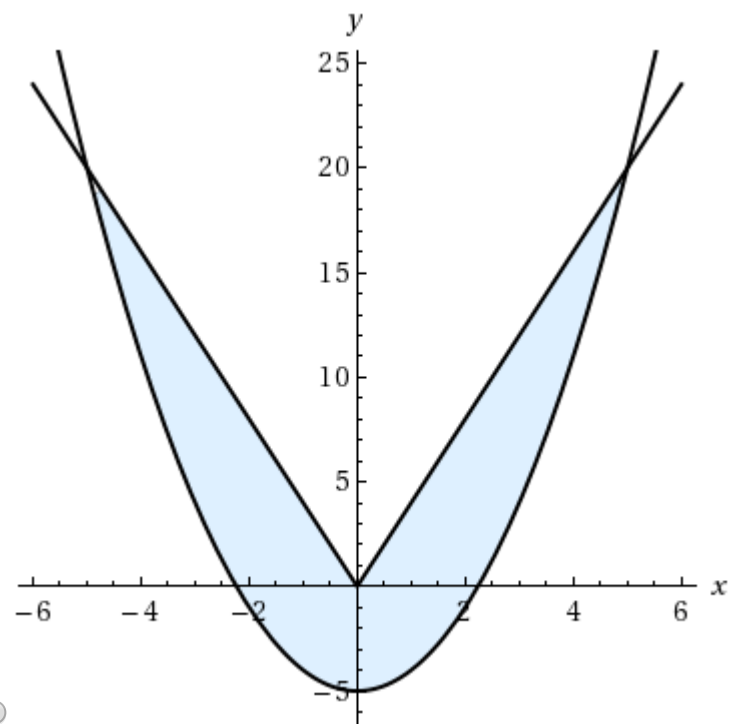
Find its area.

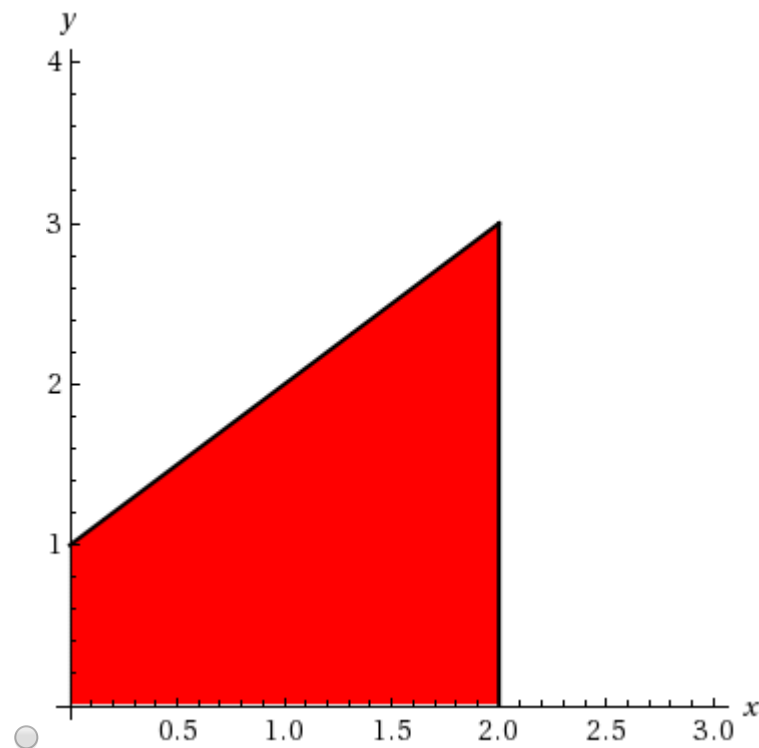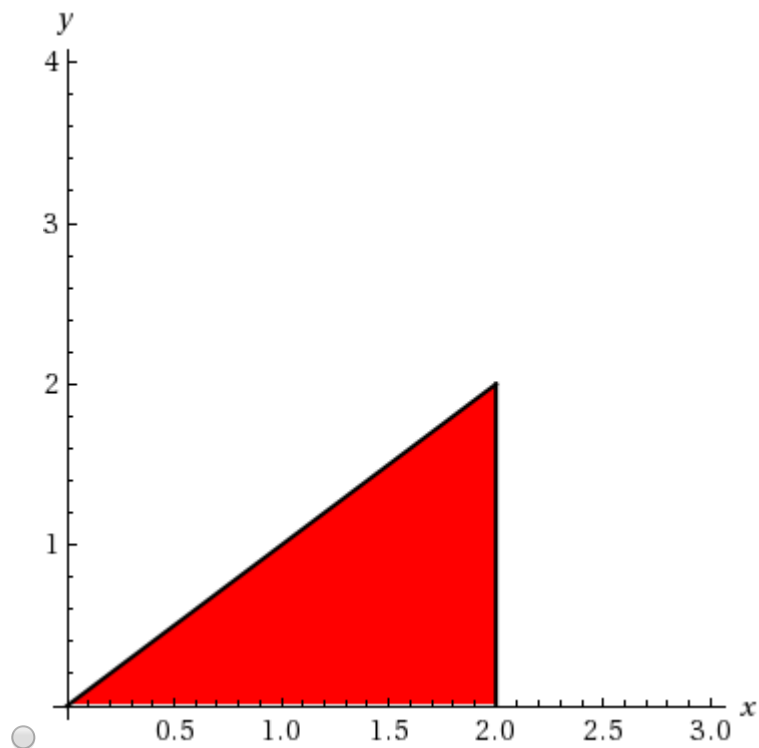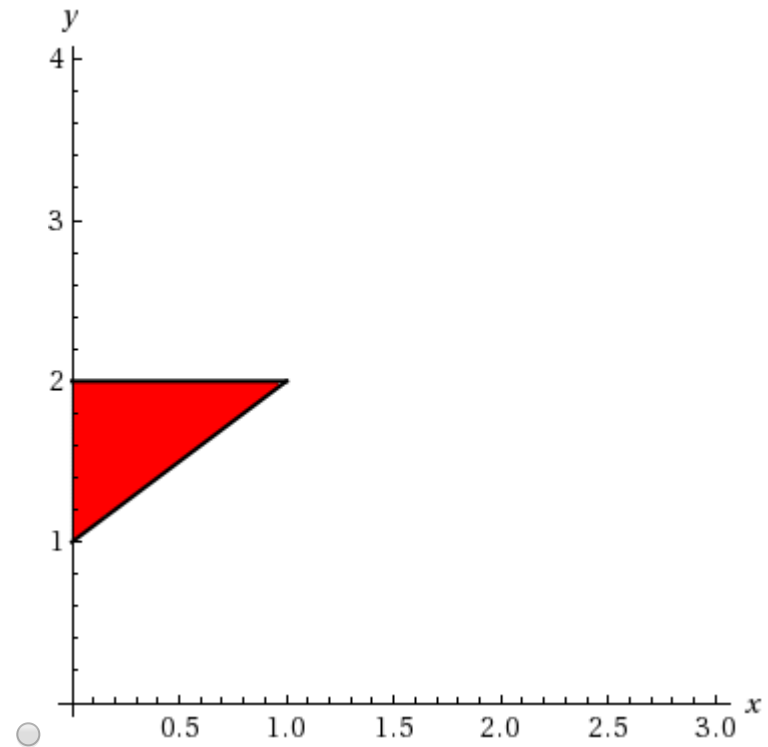**34.**   **–/0 points**   SCalcET8 6.2.001.   ⬓ **My Notes**   **Ask Your Teacher**
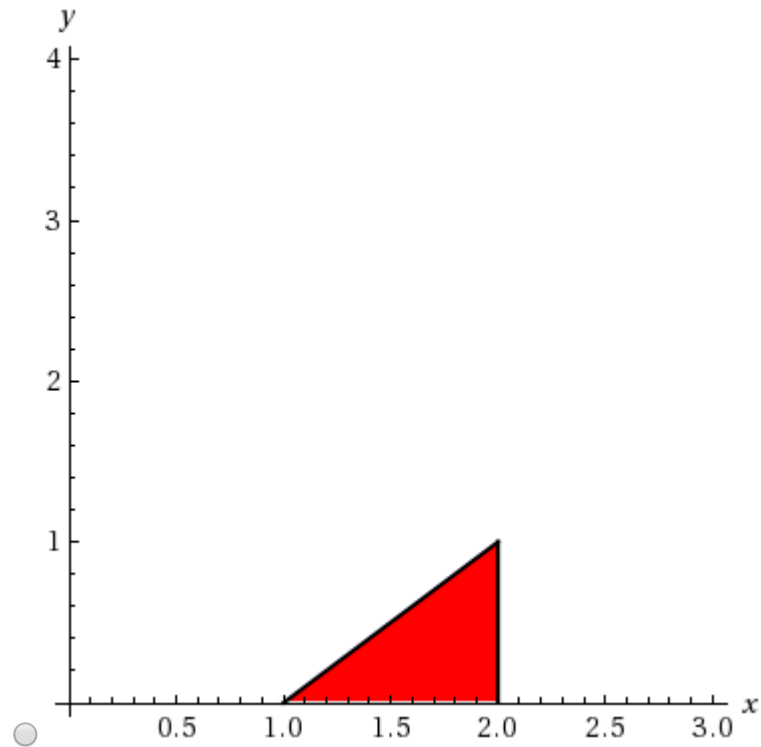
Find the volume V of the solid obtained by rotating the region bounded by the given curves about the specified line.

$y = x + 1, \quad y = 0, \quad x = 0, \quad x = 2; \quad$ about the x-axis
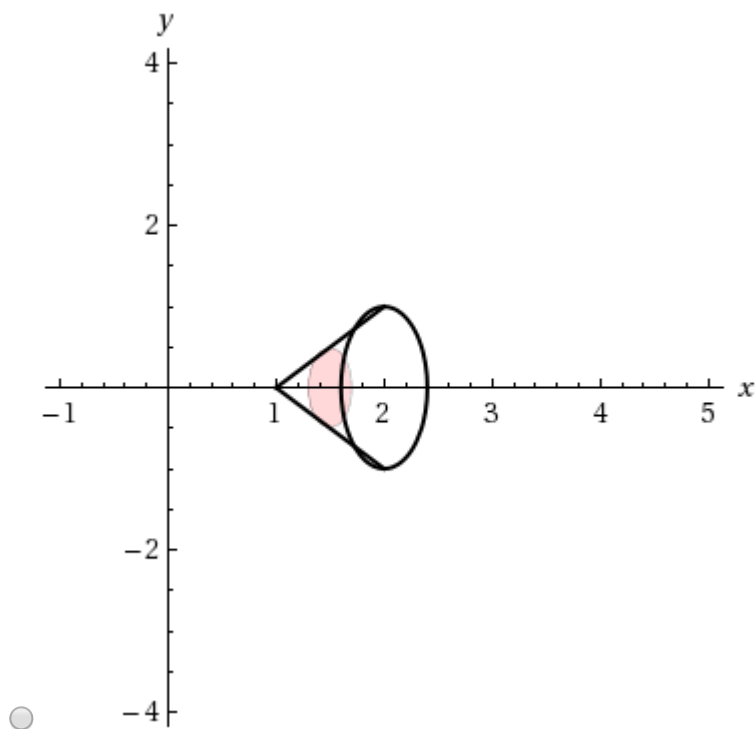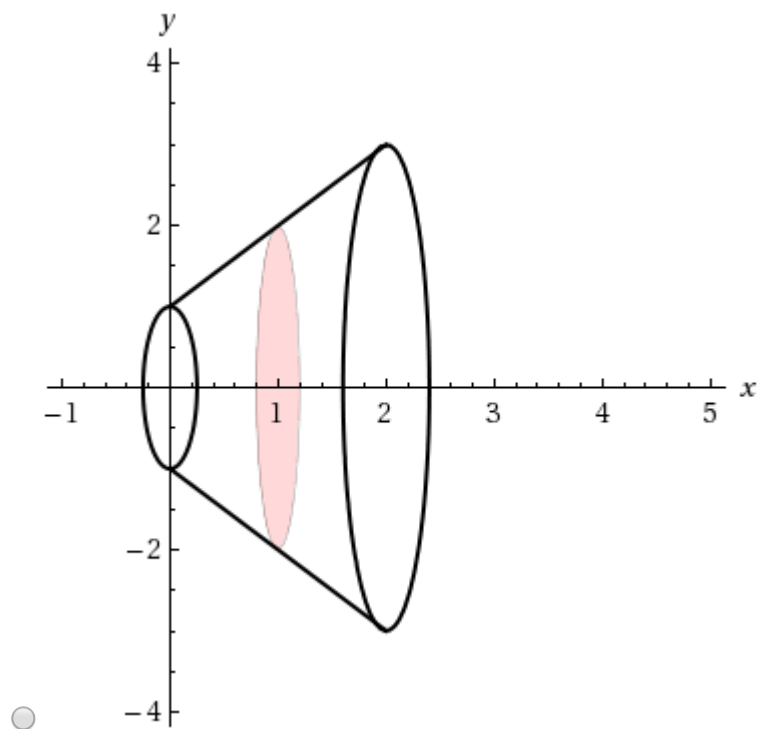
$V =$

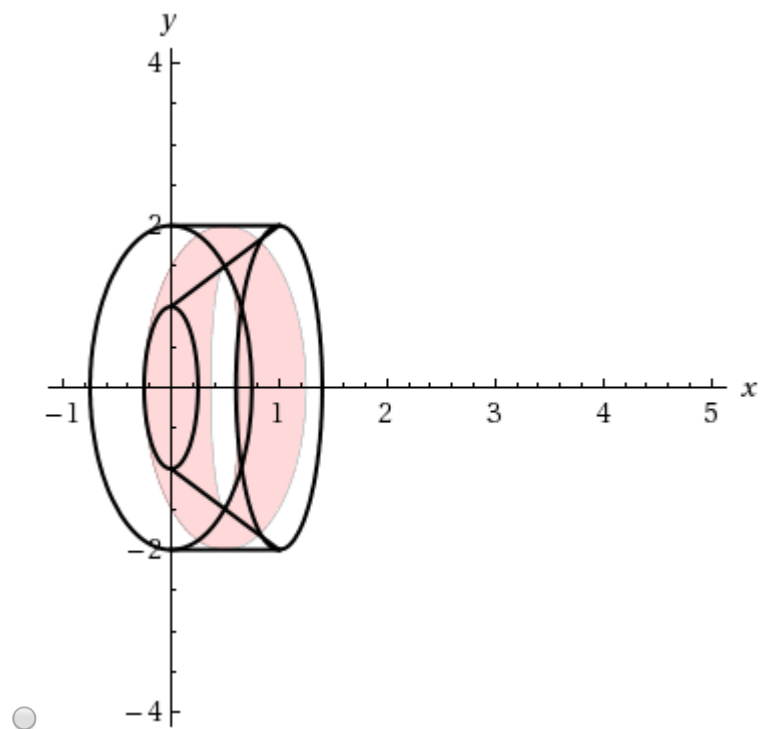Sketch the region.

Sketch the solid, and a typical disk or washer.

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35.   **–/0 points**   SCalcET8 6.2.006.   🗋 **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.

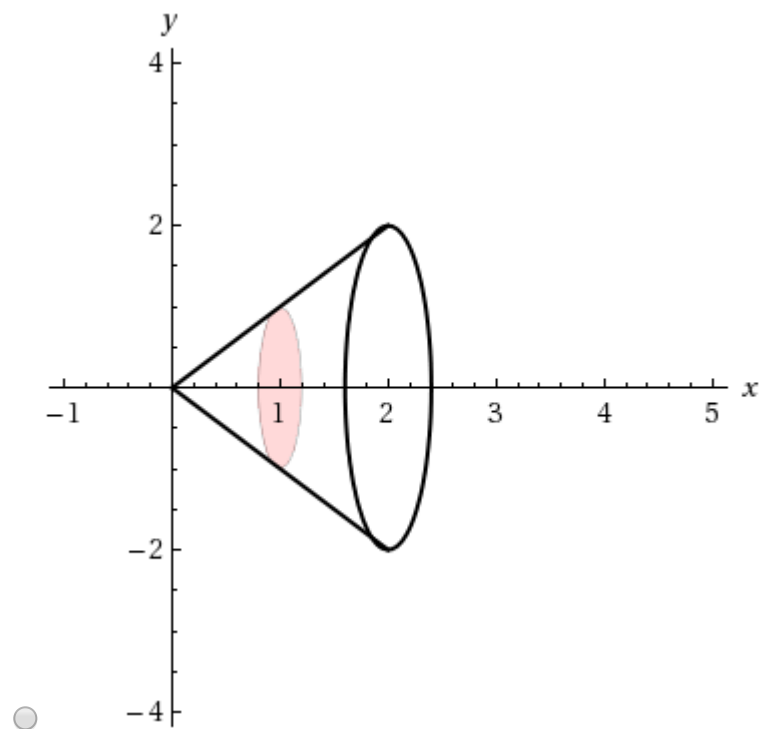$$3x = y^2, \quad x = 0, \quad y = 6; \quad \text{about the } y\text{-axis}$$

$V =$

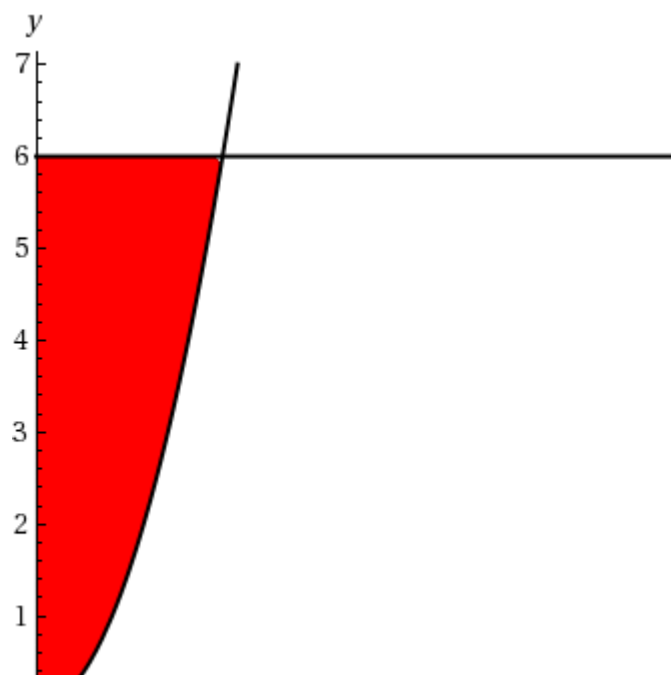Sketch the region.

Sketch the solid, and a typical disk or washer.
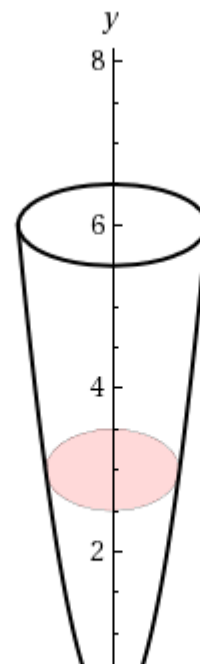
36.   **–/0 points**   SCalcET8 6.2.011.   🗋 **My Notes**   **Ask Your Teacher**

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

$$y = x^2, \quad x = y^2; \quad \text{about } y = 1$$

$V =$

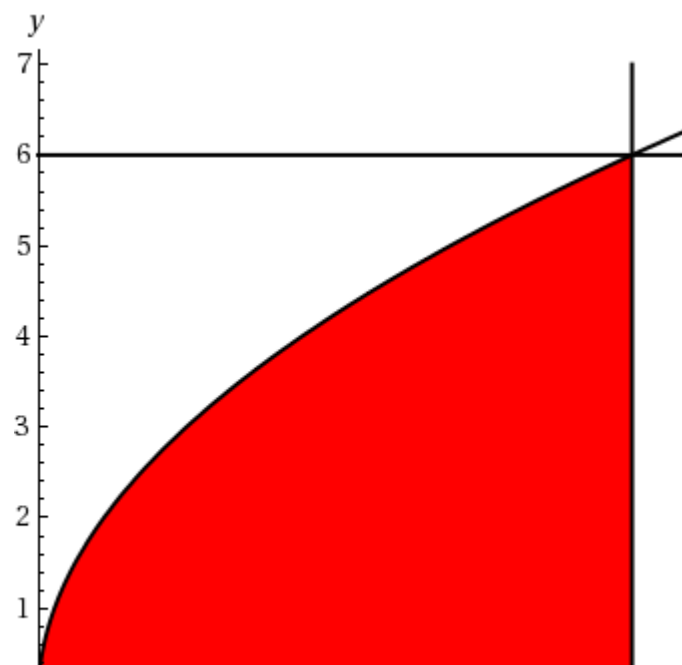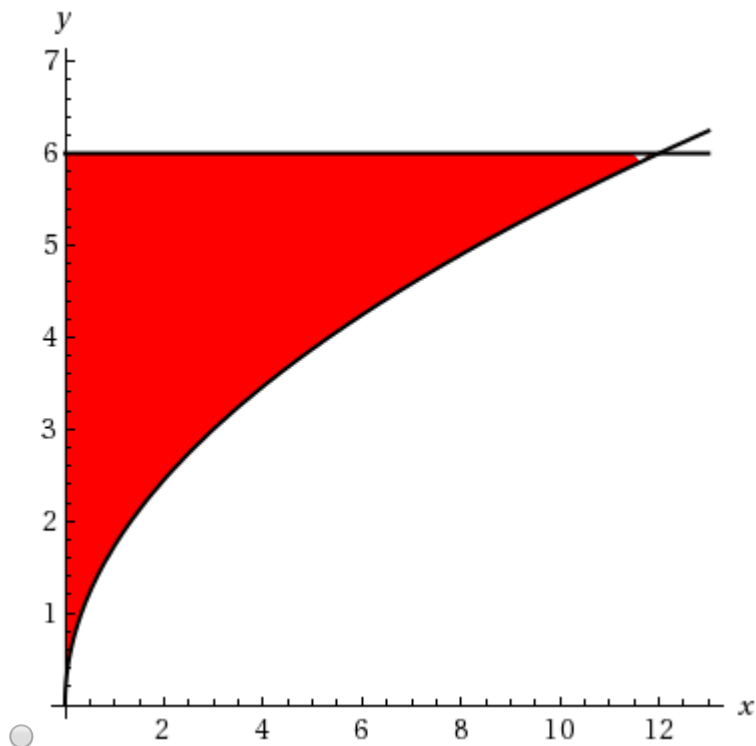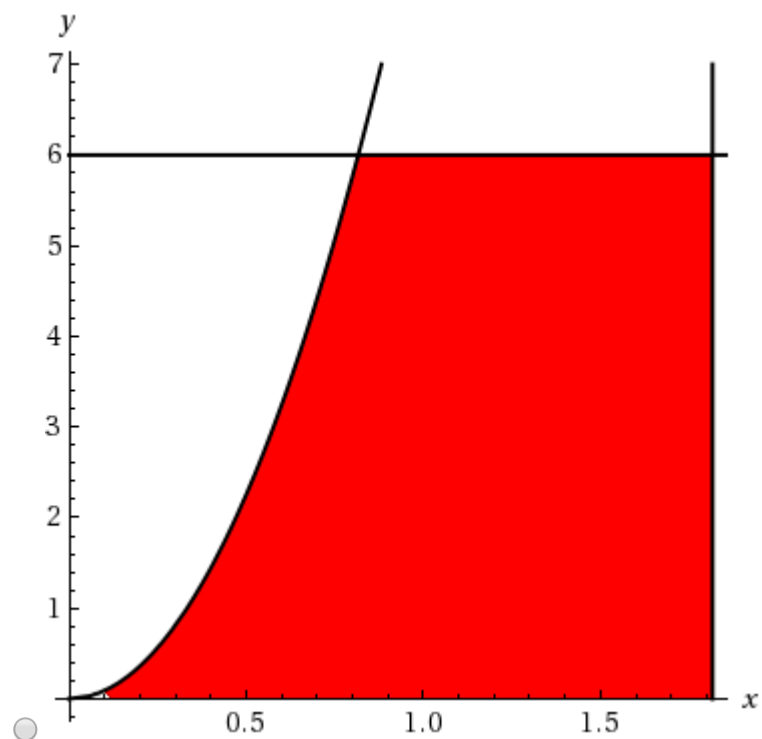Sketch the region.
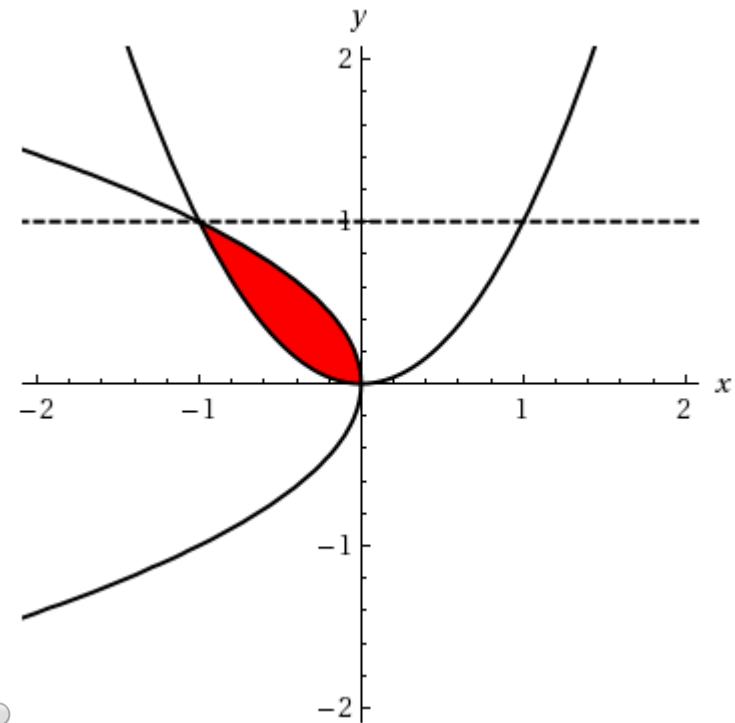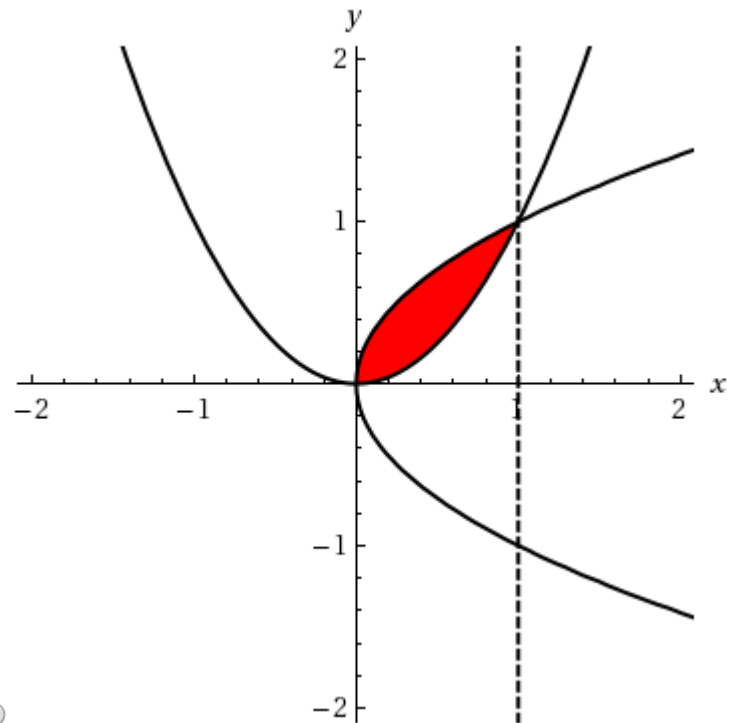
Sketch the solid, and a typical disk or washer.
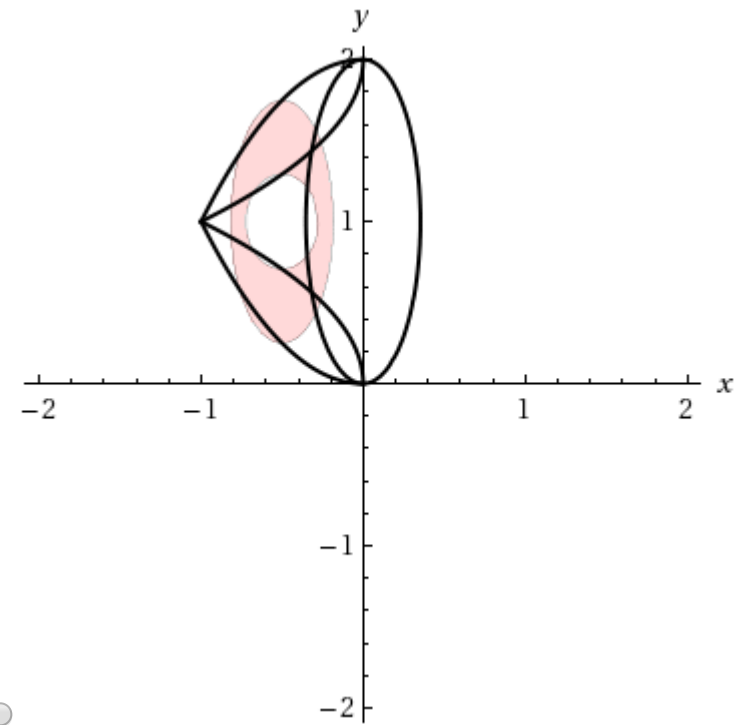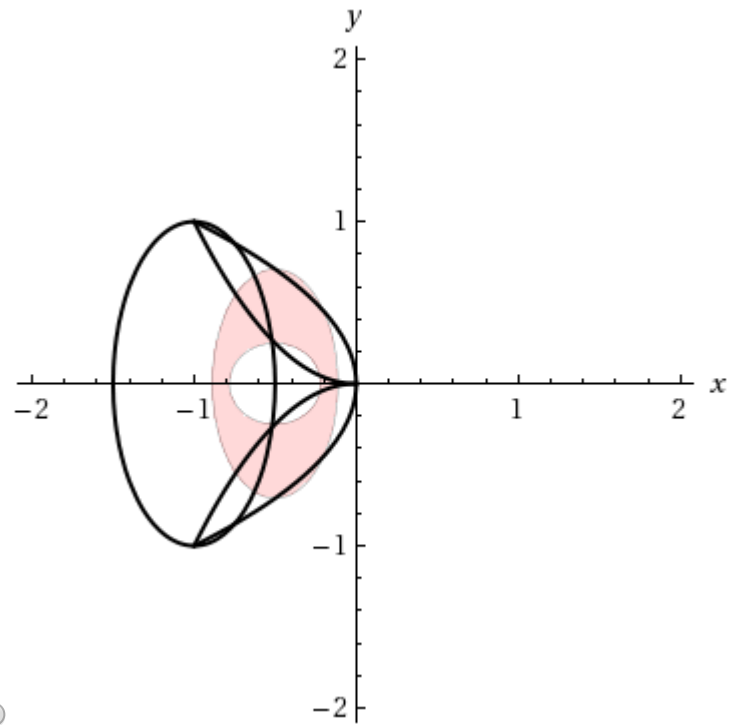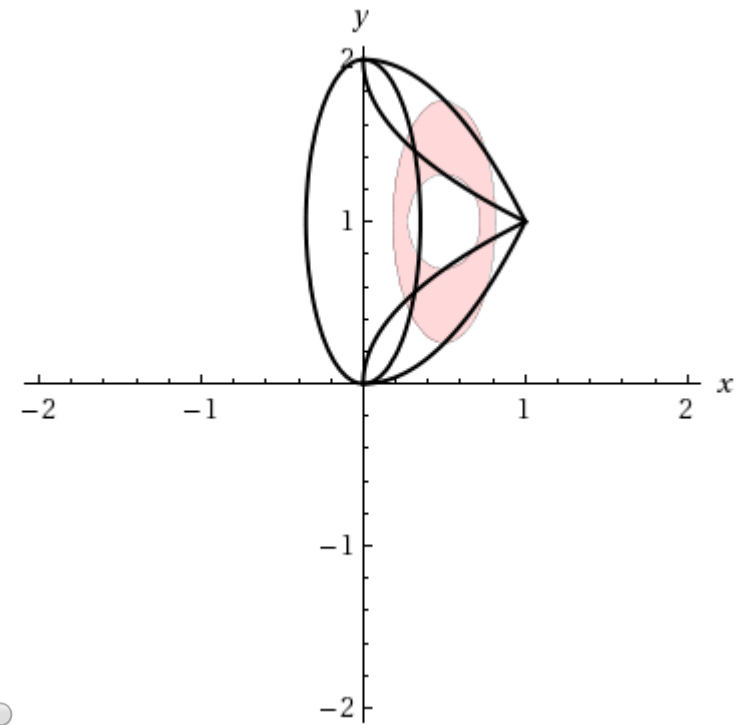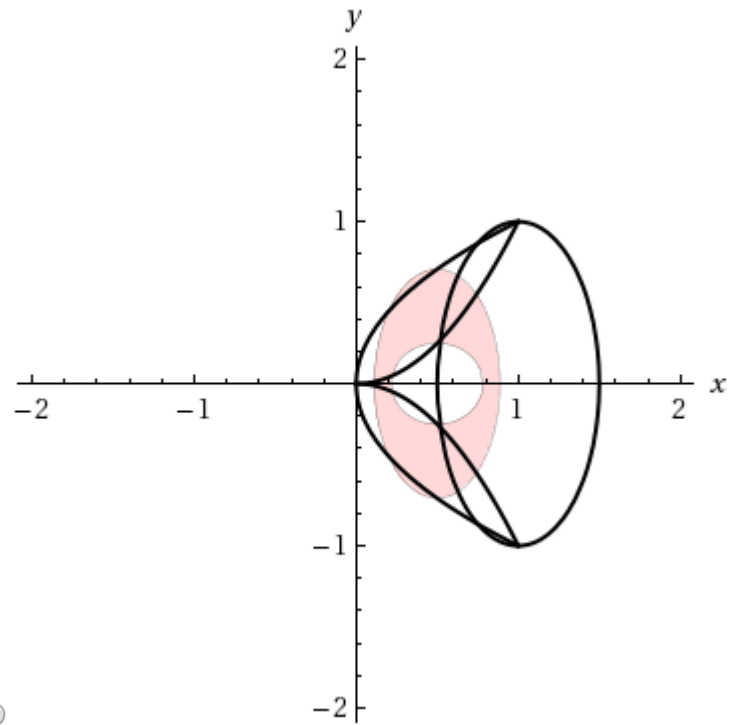
37.   **–/0 points**   **SCalcET8 6.2.014.**   ◿ **My Notes**   **Ask Your Teacher**

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

$y = 6\sin(x)$, $y = 6\cos(x)$, $0 \le x \le \pi/4$;   about $y = -1$

$V =$

Sketch the region.
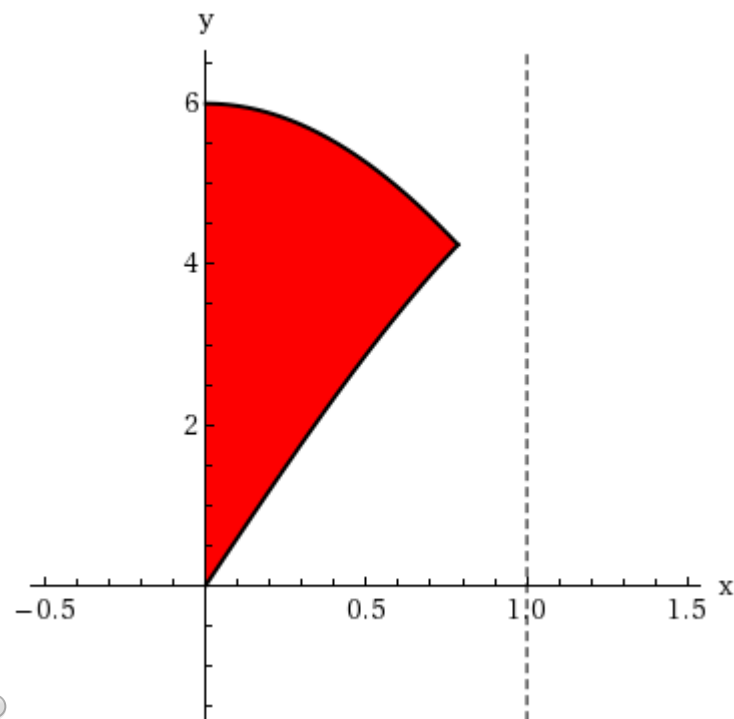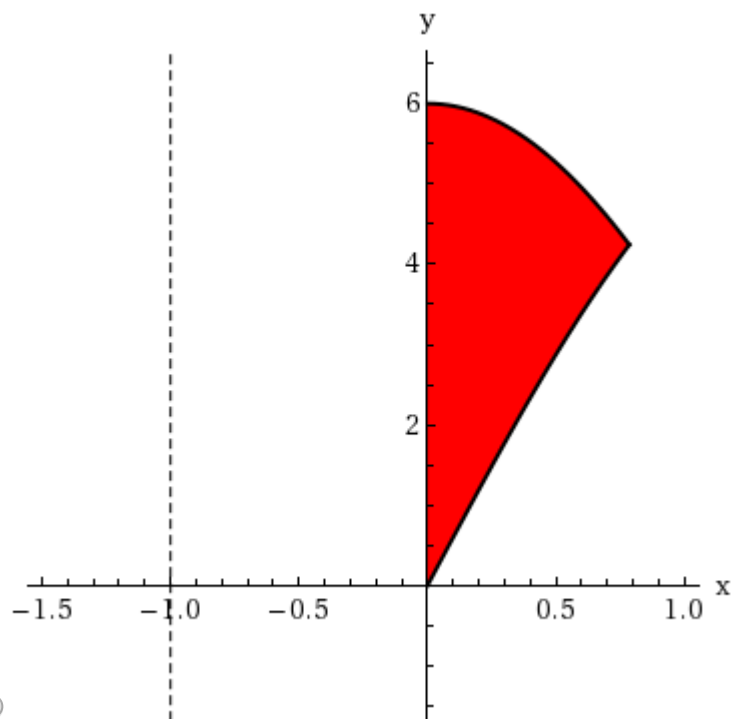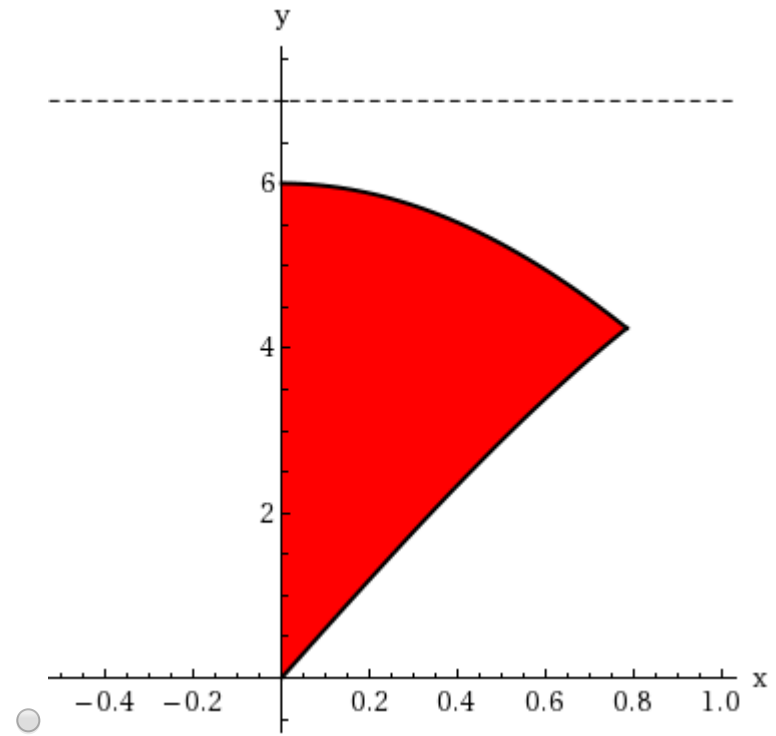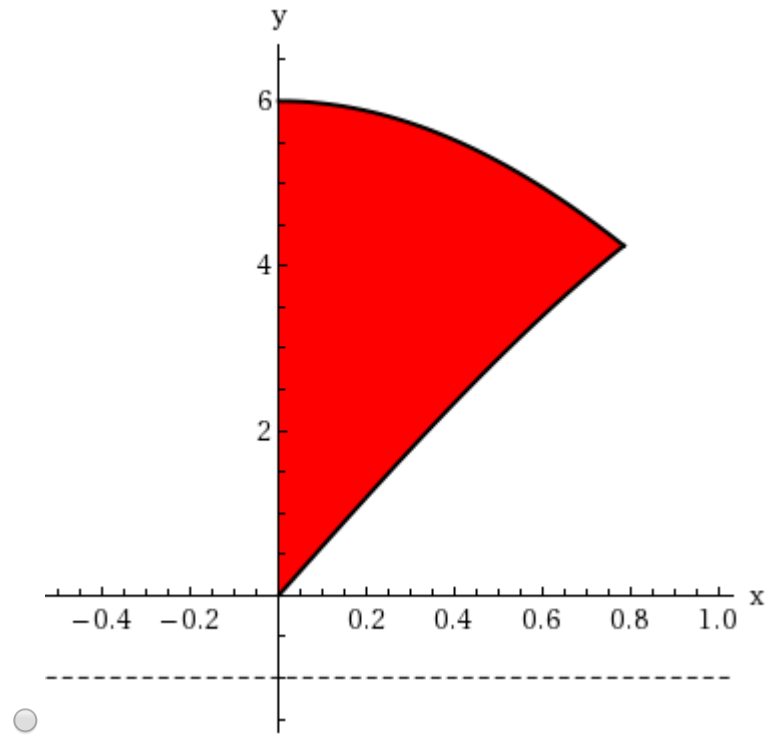
Sketch the solid, and a typical disk or washer.
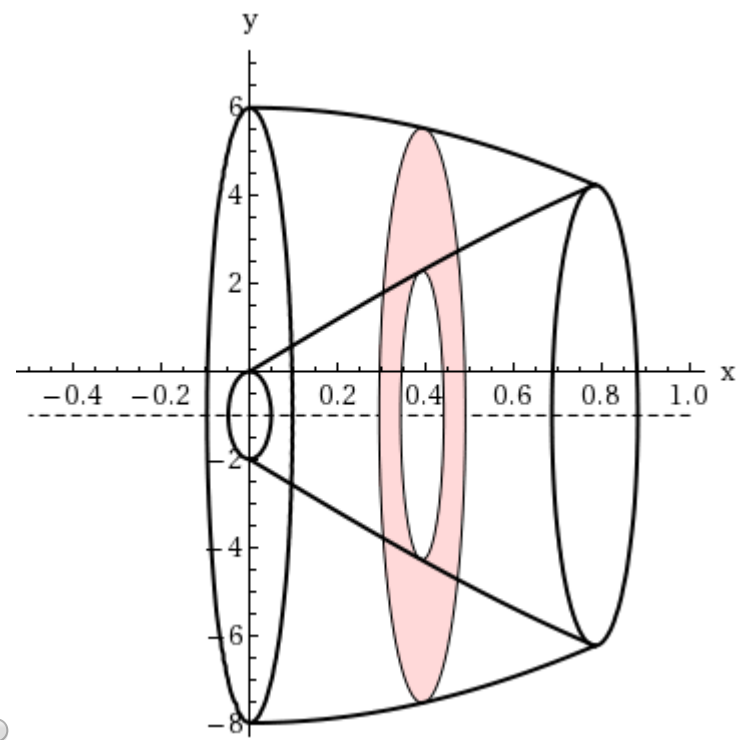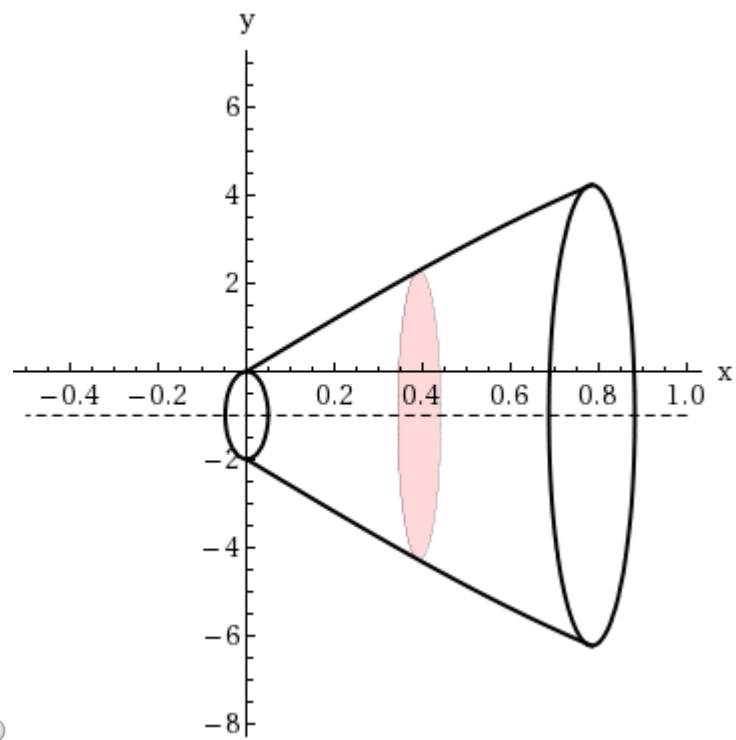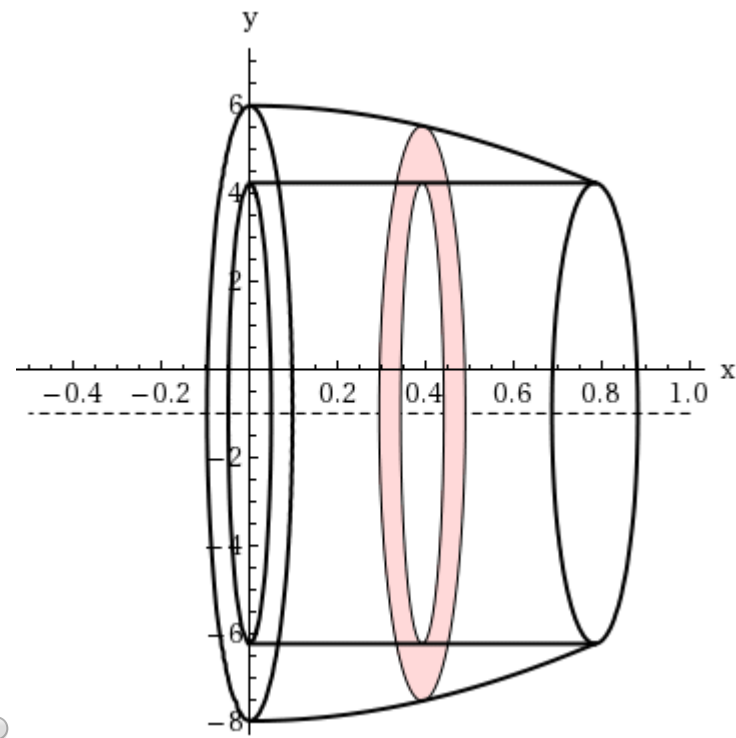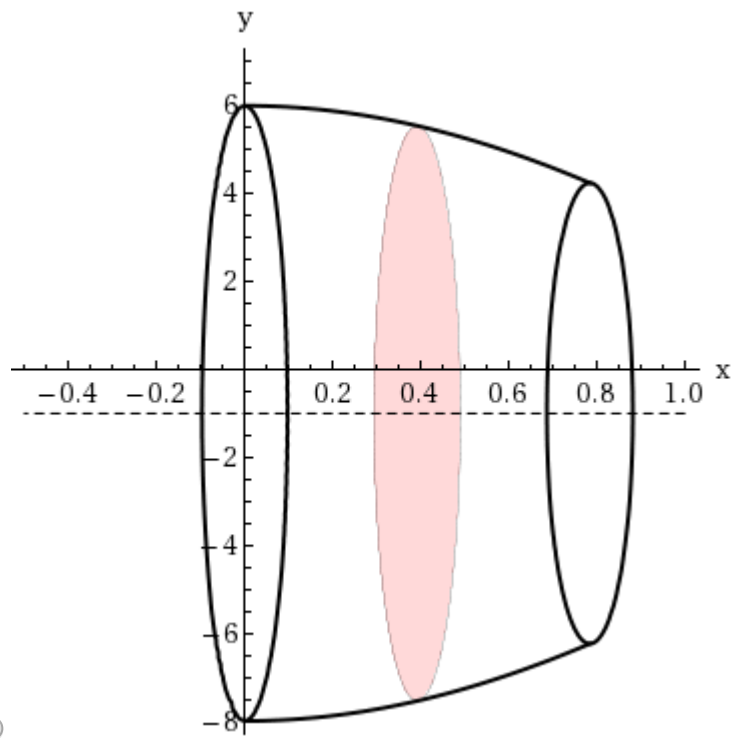
38.   **–/0 points**   SCalcET8 6.2.015.   ◻ **My Notes**   **Ask Your Teacher**
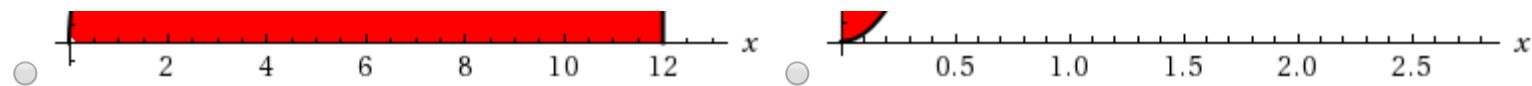
Find the volume V of the solid obtained by rotating the region bounded by the given curves about the specified line.

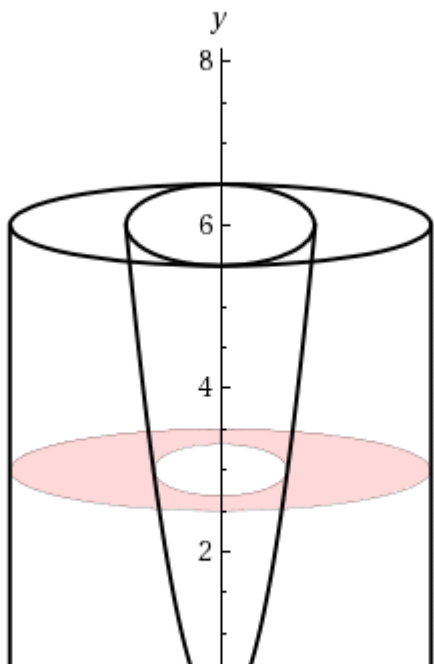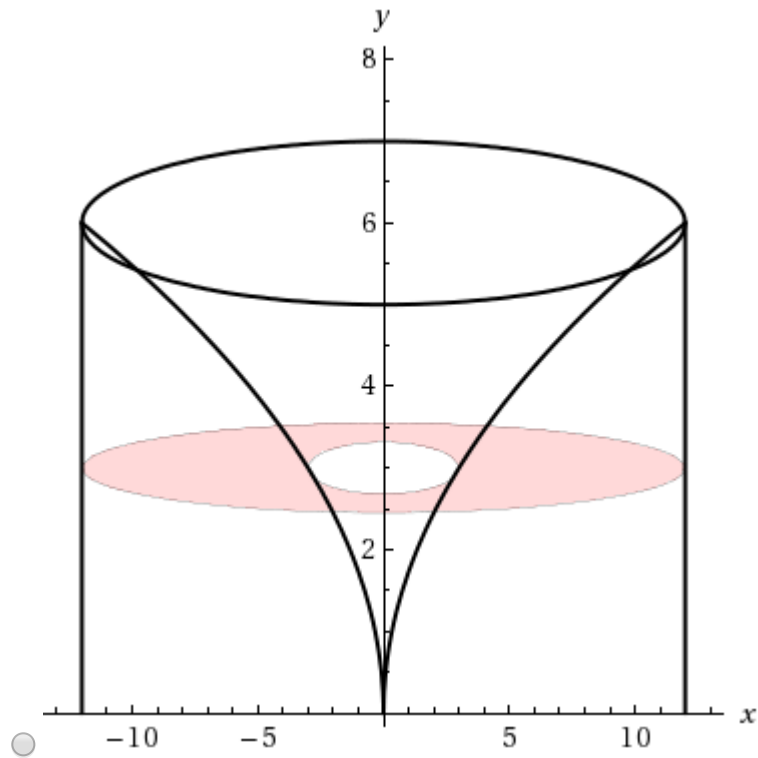$y = 8x^3, \quad y = 0, \quad x = 1; \quad$ about $x = 2$

Sketch the region.
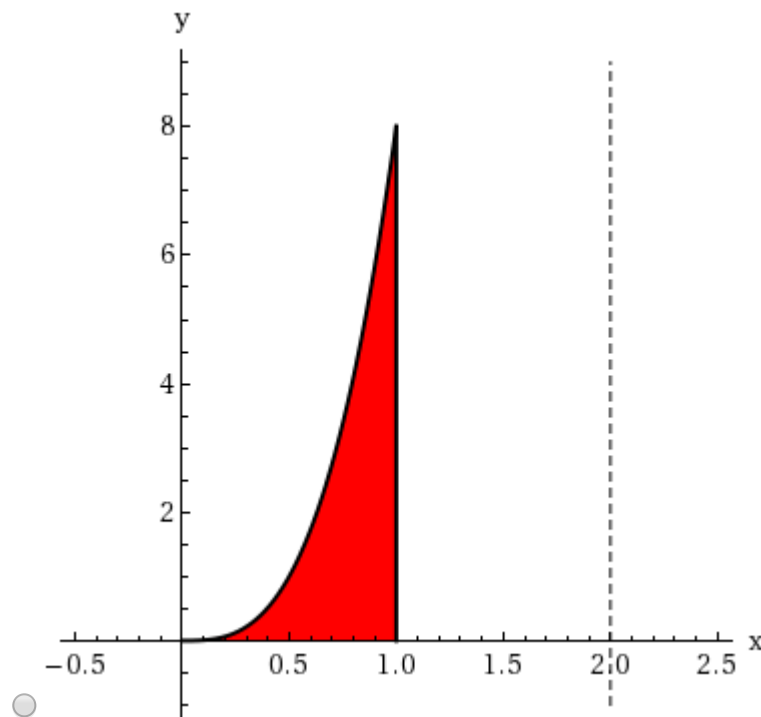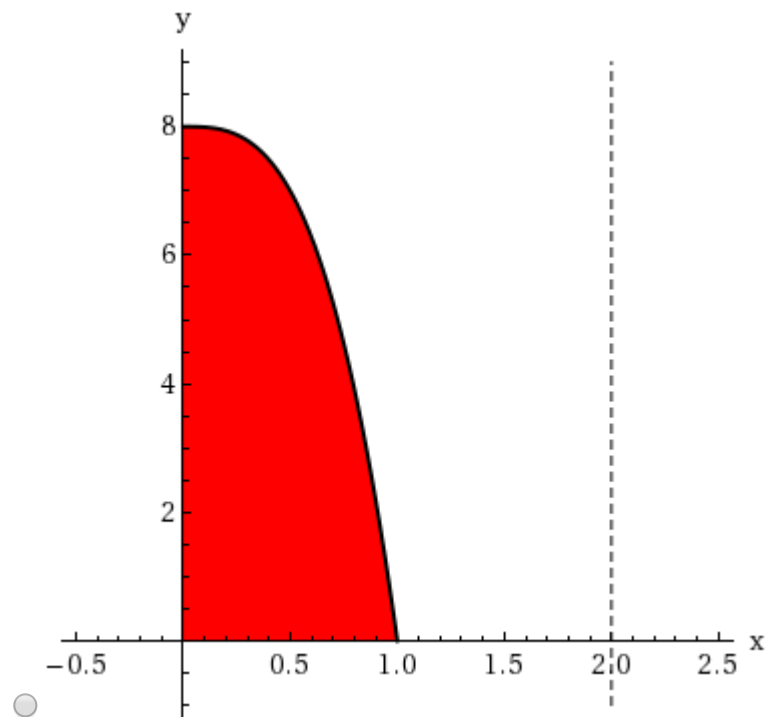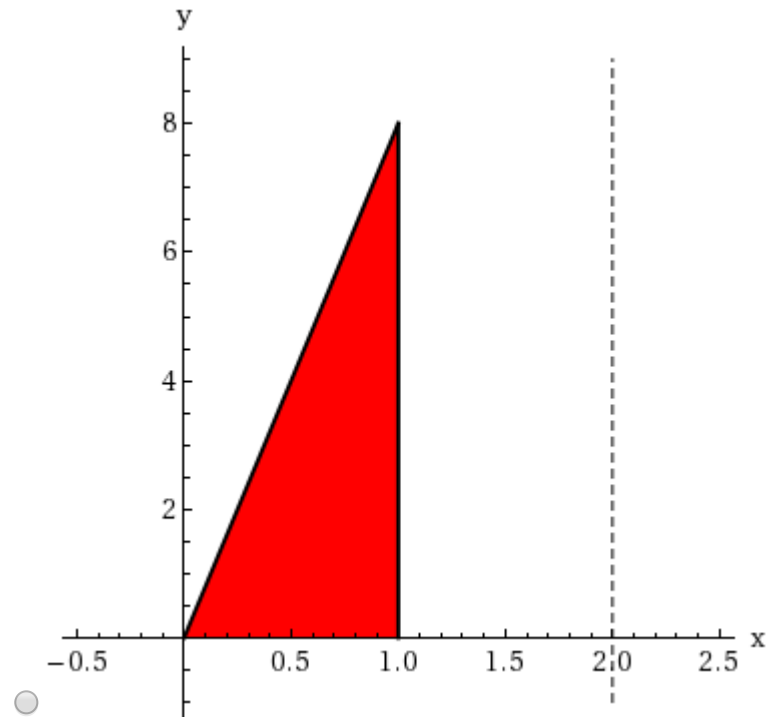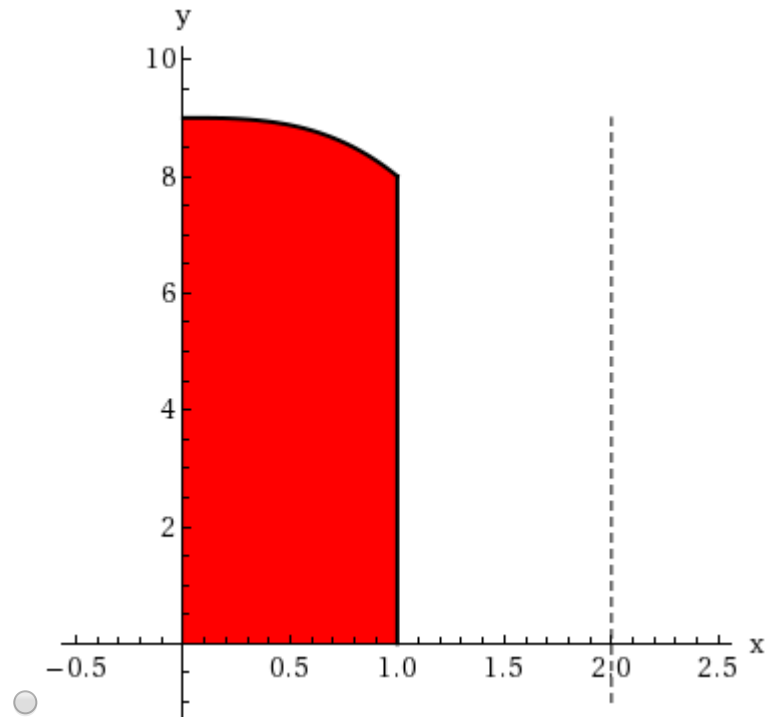
Sketch the solid, and a typical disk or washer.
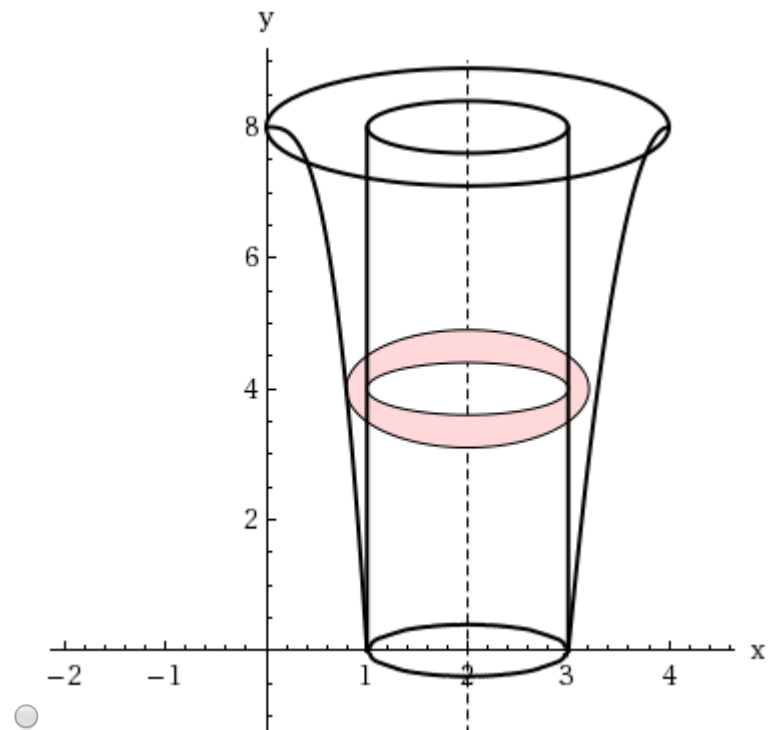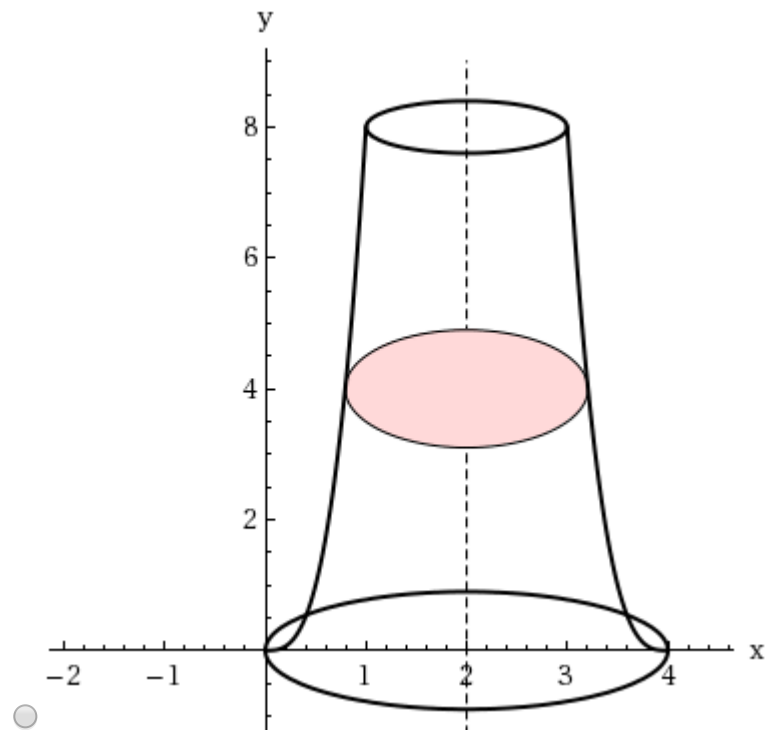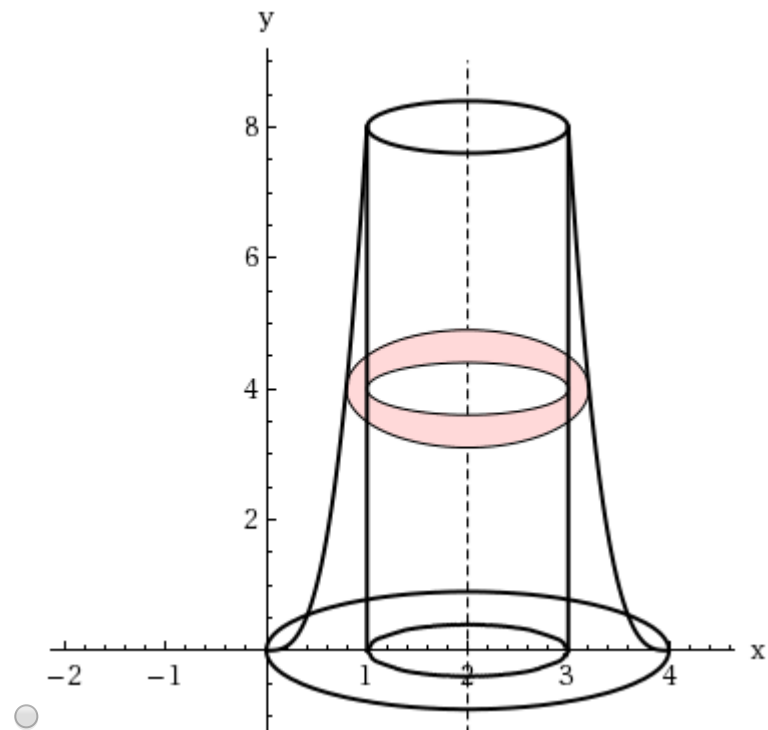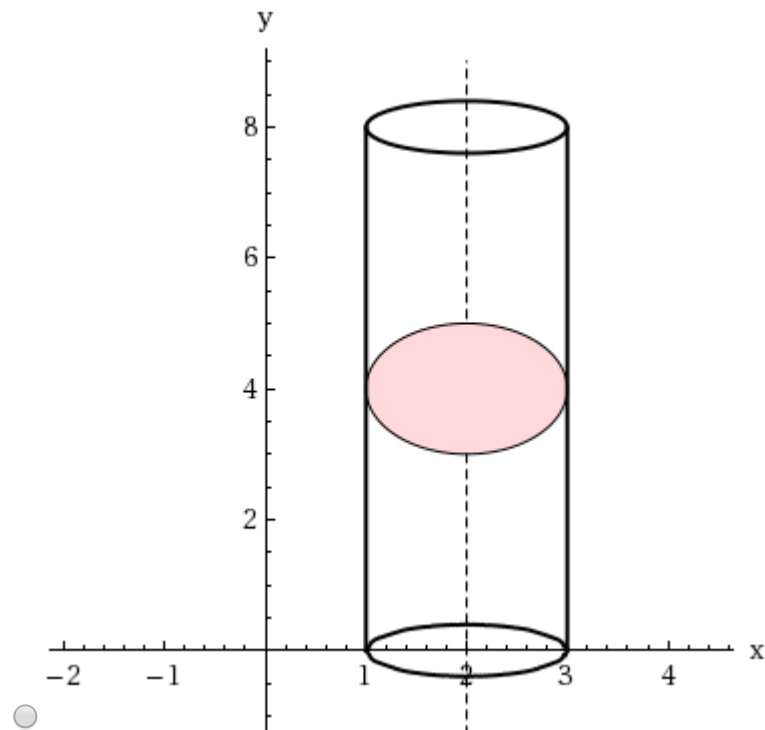
39.   **–/0 points**   SCalcET8 6.2.018.   🗒 **My Notes**   **Ask Your Teacher**

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

$y = x$, $y = 0$, $x = 2$, $x = 7$;   about $x = 1$
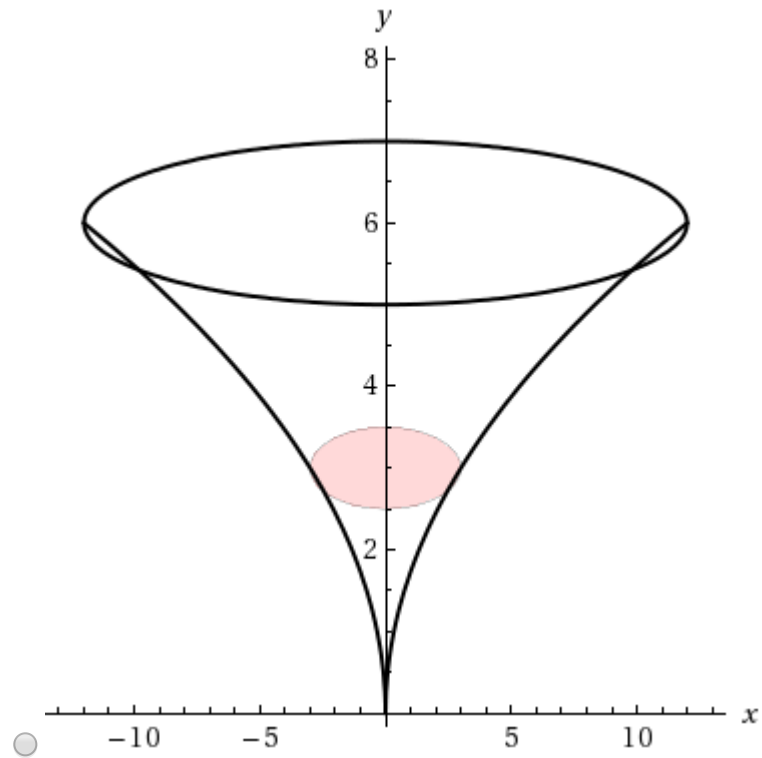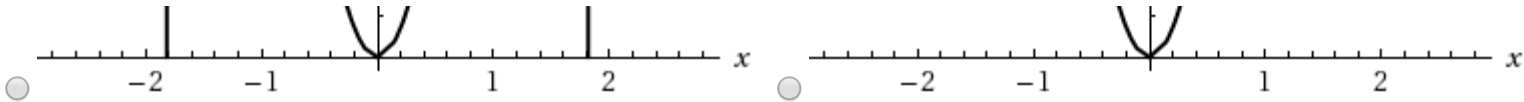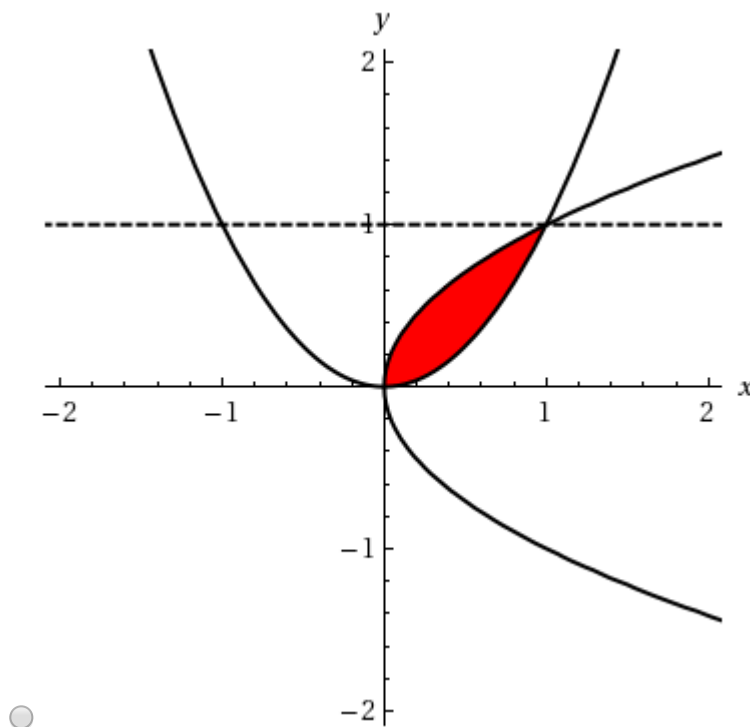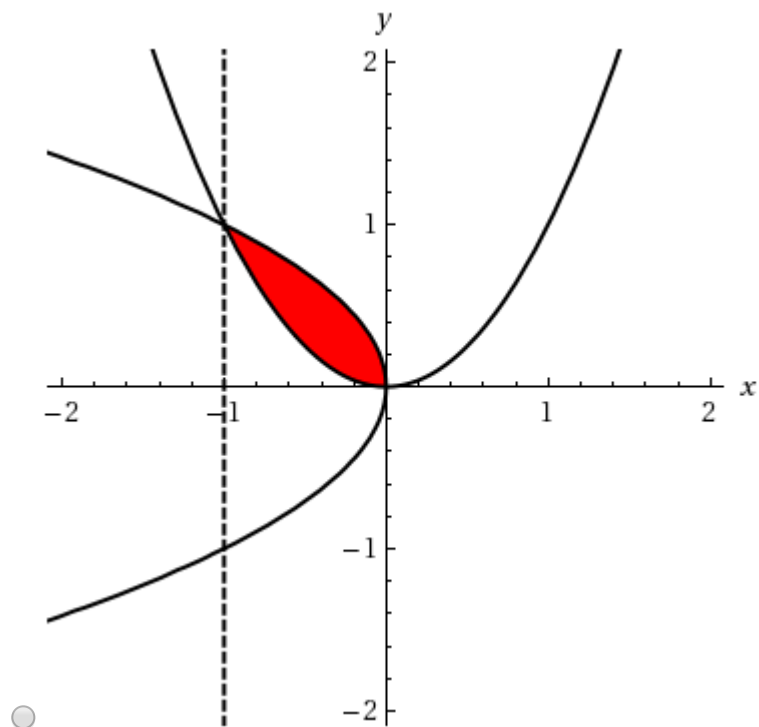
$V =$

Sketch the region.
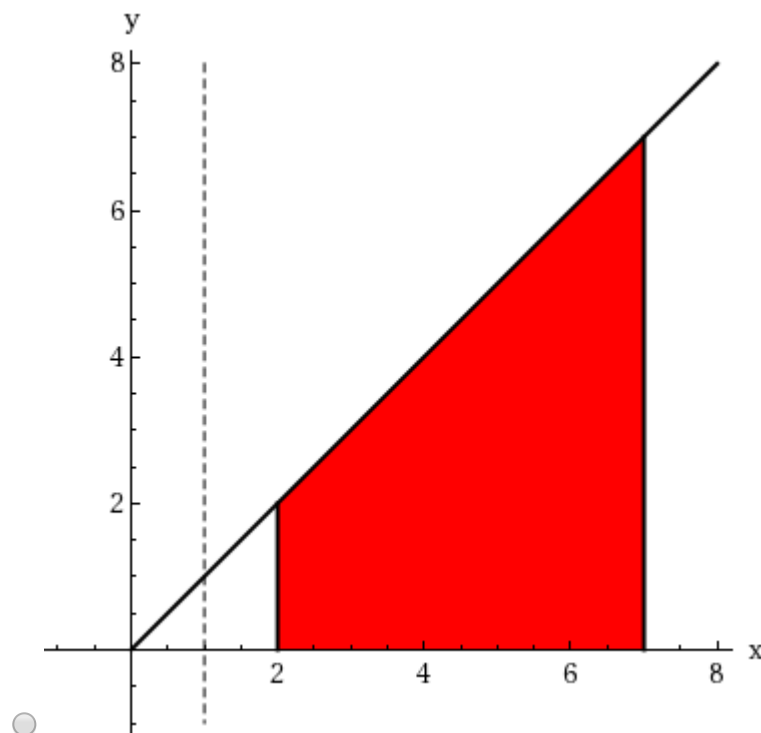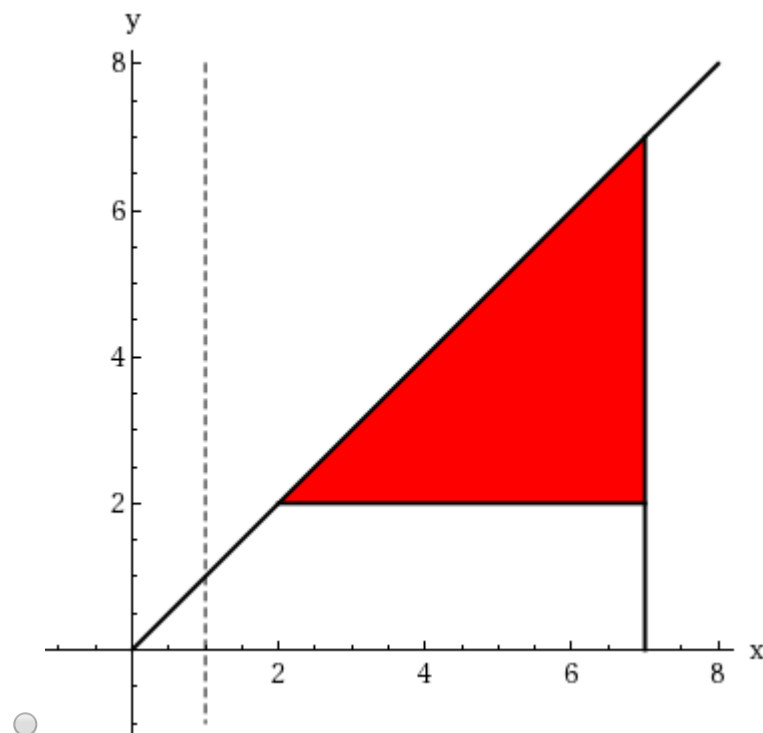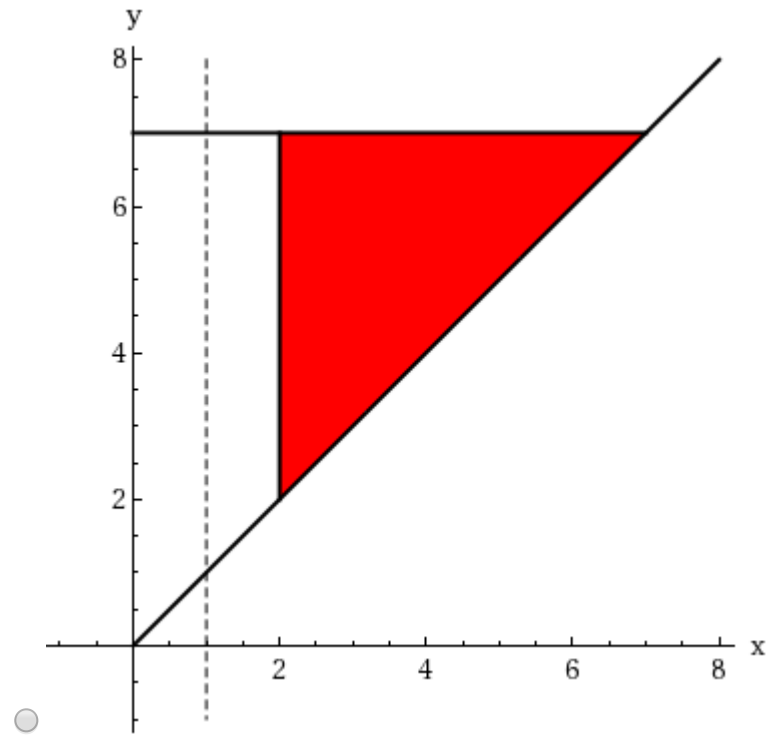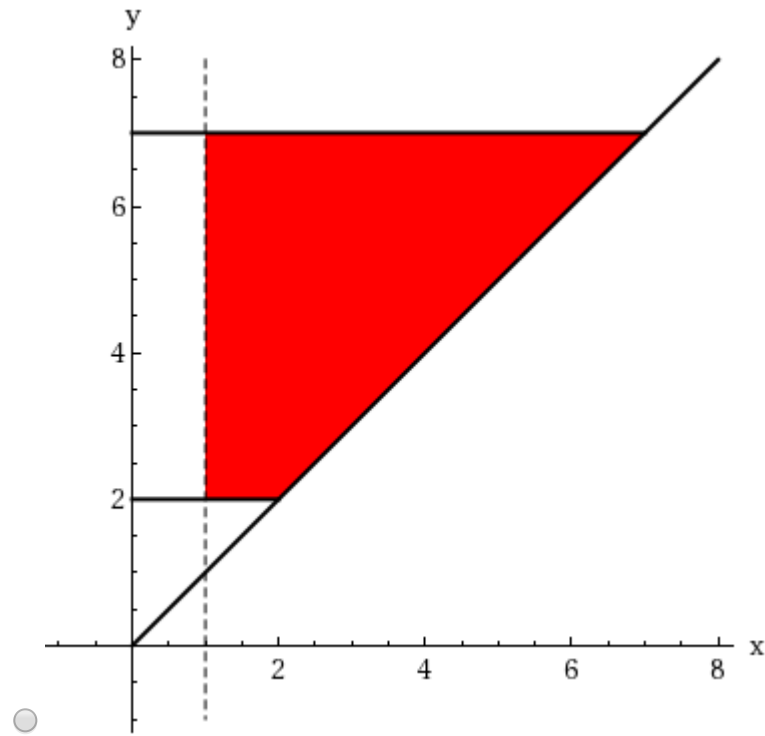
Sketch the solid, and a typical disk or washer.
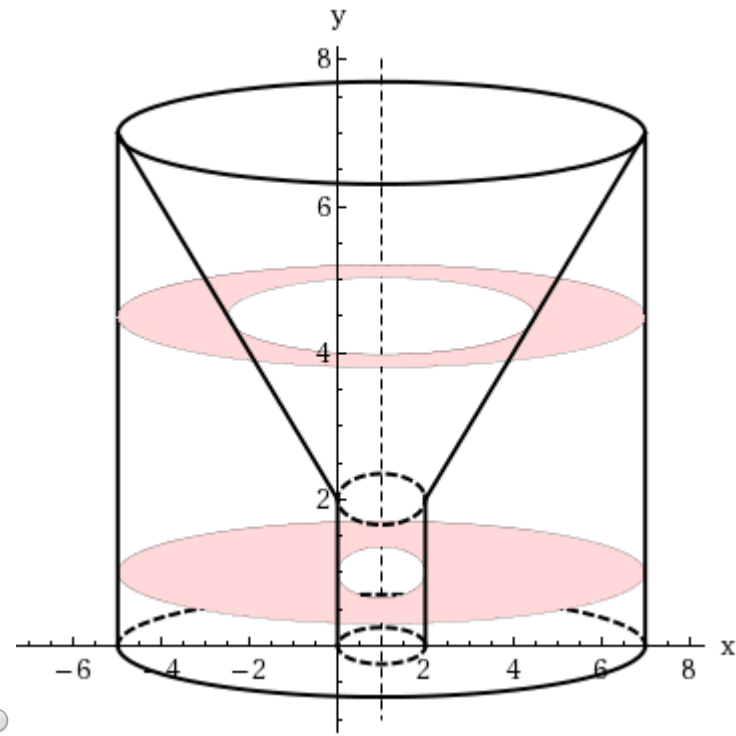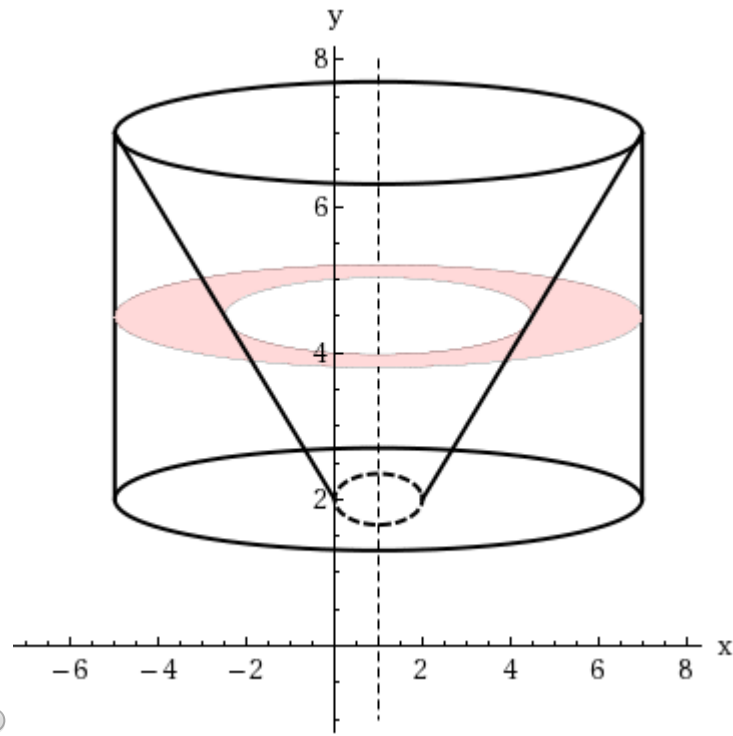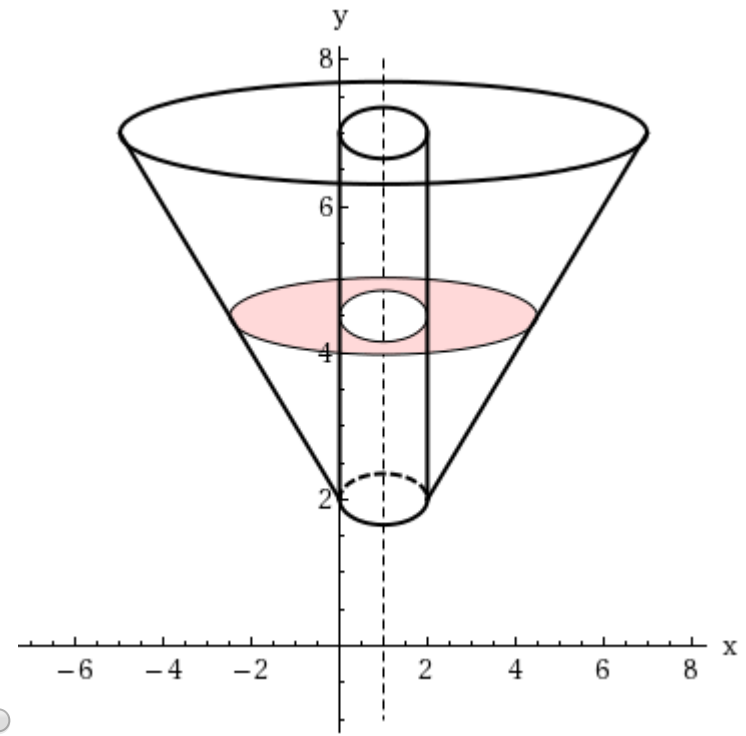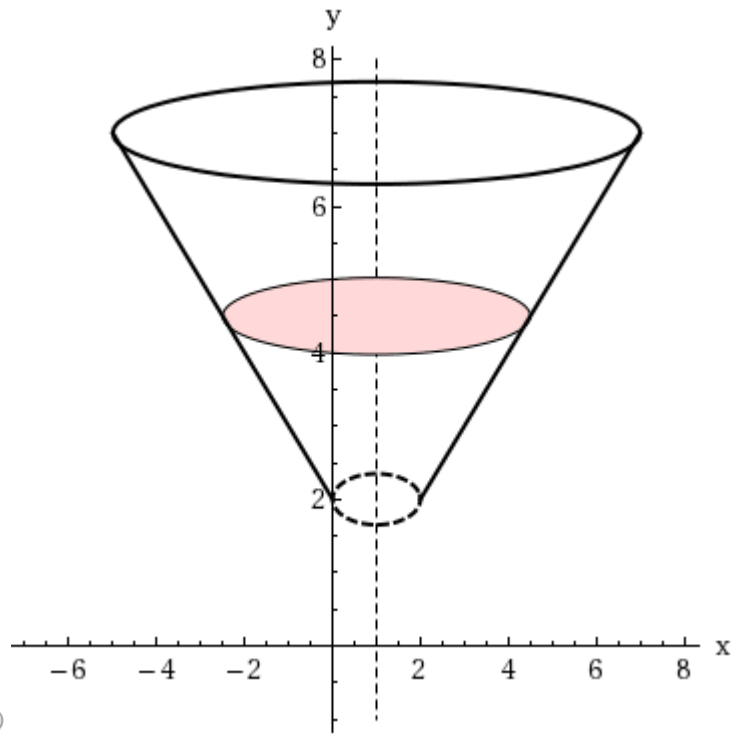
40.   **–/0 points**   **SCalcET8 6.2.023.**   ⬛ **My Notes**   **Ask Your Teacher**

Refer to the figure and find the volume generated by rotating the given region about the specified line.

$\mathscr{R}_2$ about OA

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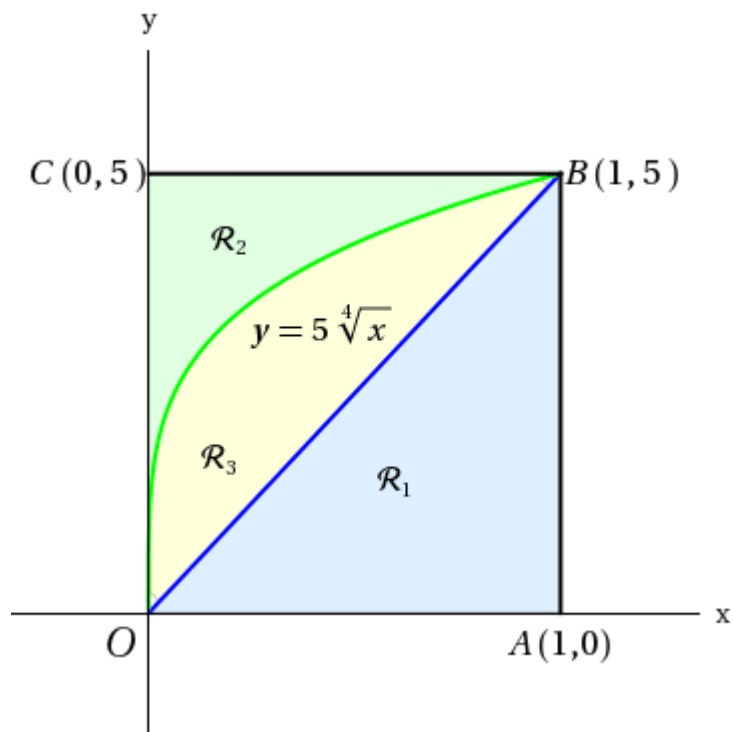
41.   **–/0 points**   SCalcET8 6.2.049.   📄 **My Notes**   **Ask Your Teacher**

Find the volume V of the described solid S.

A cap of a sphere with radius r and height h

$V =$
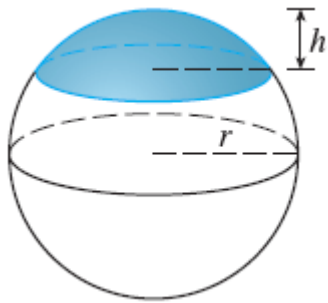
42.   **–/0 points**   SCalcET8 6.3.002.   ⬚ **My Notes**   **Ask Your Teacher**

Let *S* be the solid obtained by rotating the region shown in the figure about the *y*-axis. (Assume *a* = 9 and *b* = 3.)

$y = a \sin(bx^2)$
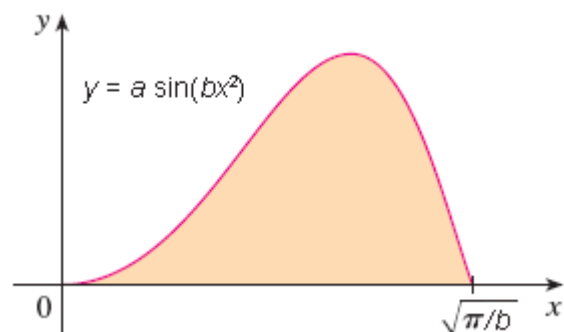
Sketch a typical approximating shell.
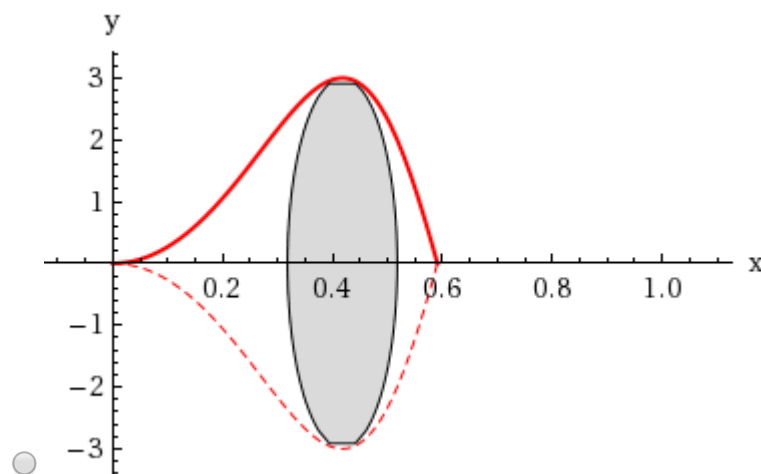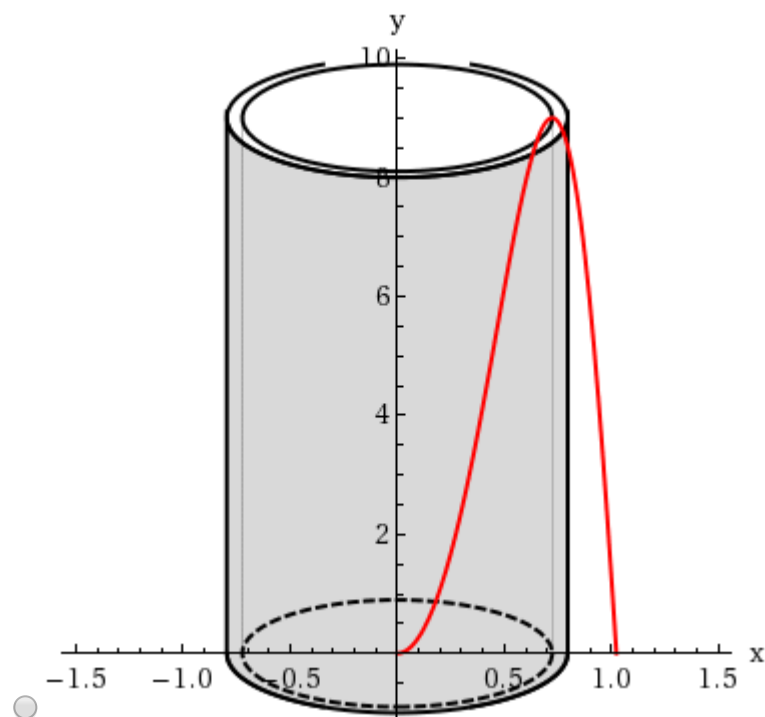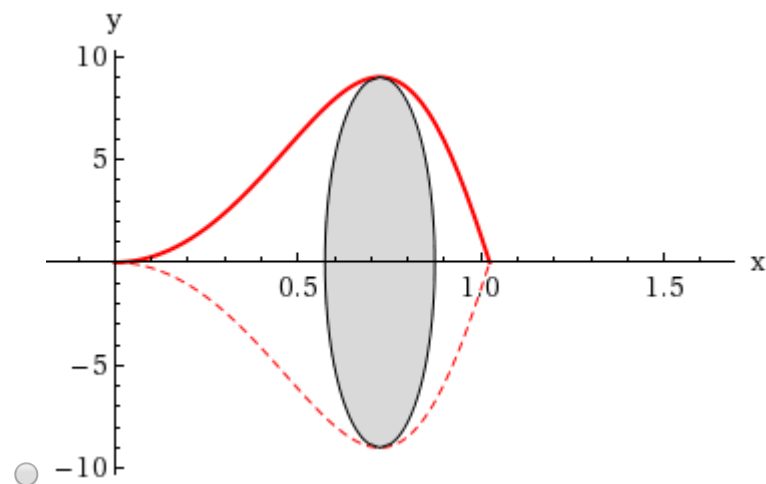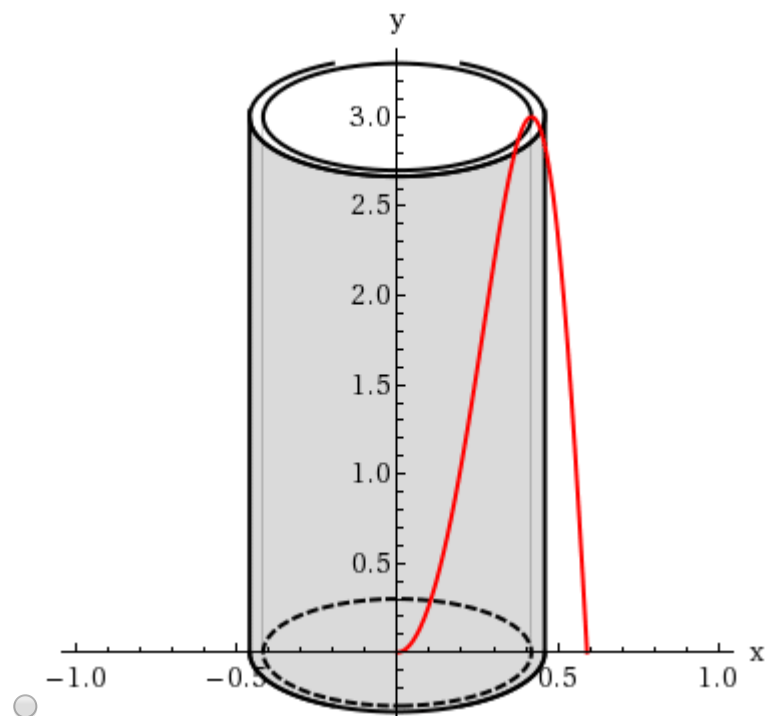
Find its circumference c and height h.

$c(x) =$

$h(x) =$

Use shells to find the volume V of S.

$V =$

---

43.   **–/0 points**   **SCalcET8 6.3.003.**   🗒 **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.

$$y = 2\sqrt[3]{x}, \quad y = 0, \quad x = 1$$

---

44.   **–/0 points**   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.

$$y = 13e^{-x^2}, \quad y = 0, \quad x = 0, \quad x = 1$$

$V =$

Sketch the region and a typical shell.

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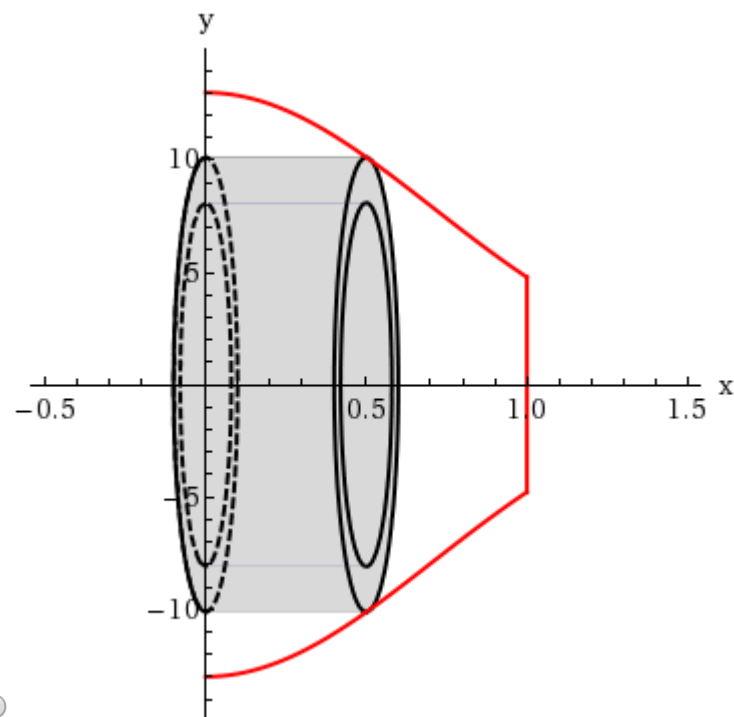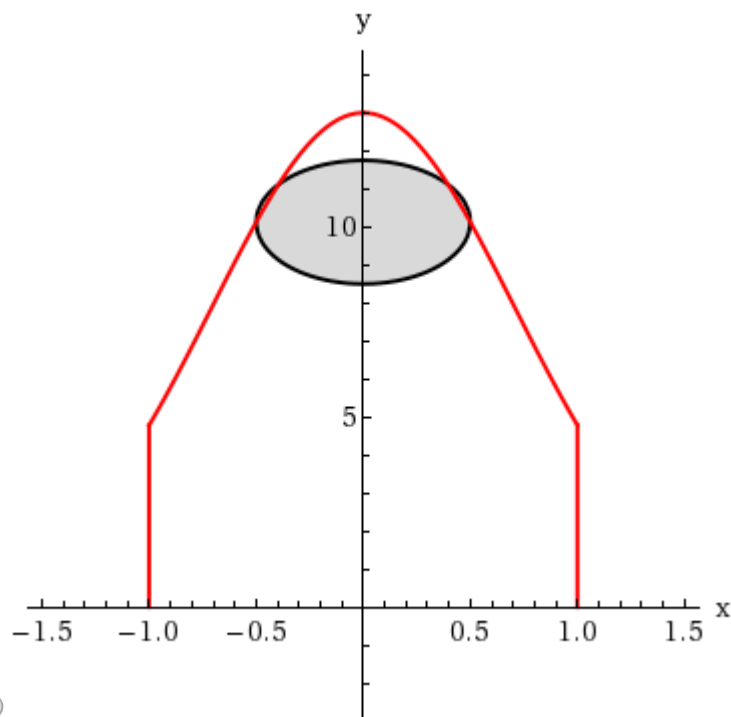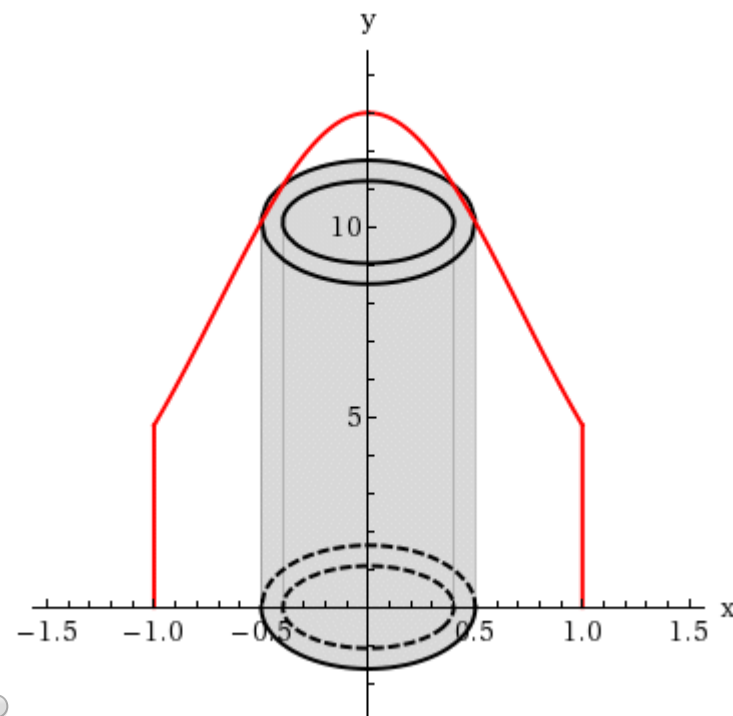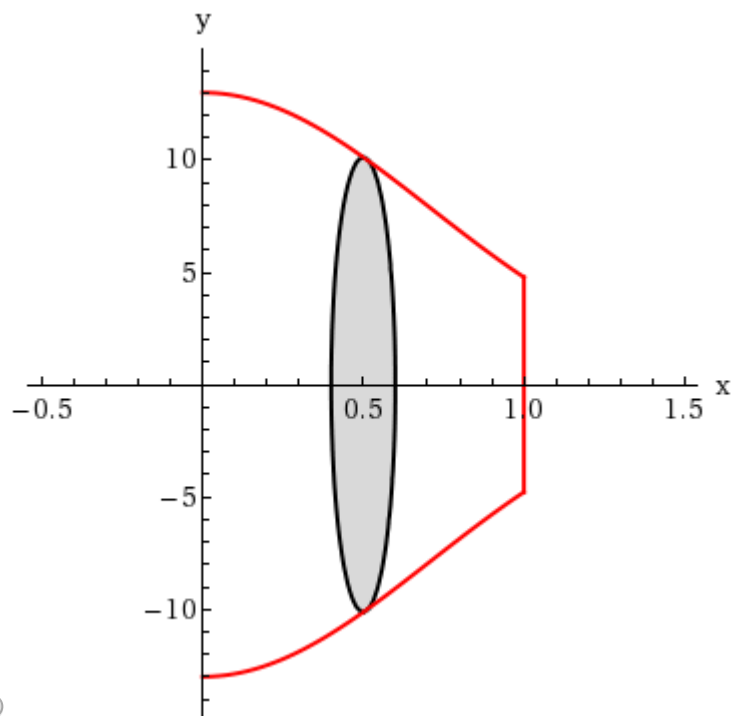
45.   **–/0 points**   SCalcET8 6.3.005.MI.SA.   ▱ **My Notes**   **Ask Your Teacher**

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.

$$y = 10e^{-x^2}, \quad y = 0, \quad x = 0, \quad x = 1$$

Sketch the region and a typical shell.

46.   **–/0 points**   **SCalcET8 6.3.008.**   📑 **My Notes**   **Ask Your Teacher**

Let V be the volume of the solid obtained by rotating about the y-axis the region bounded $y = \sqrt{9x}$ and $y = \dfrac{x^2}{9}$. Find V by slicing.

$V =$

Draw a diagram to explain your method.
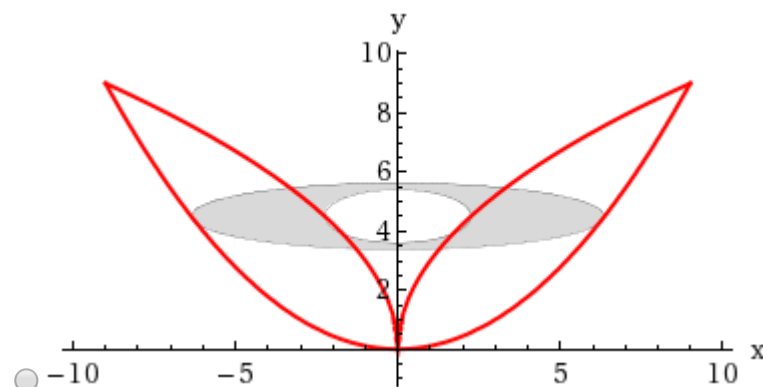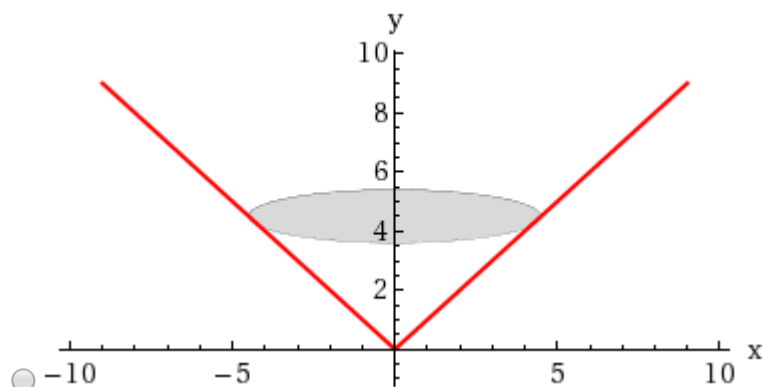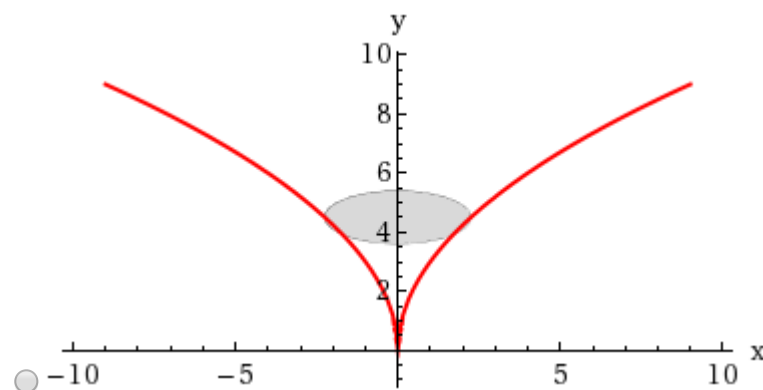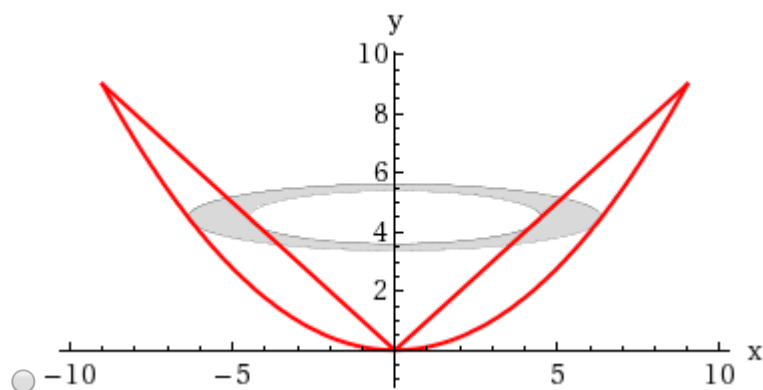
Find *V* by cylindrical shells.

V =

Draw a diagram to explain your method.

----
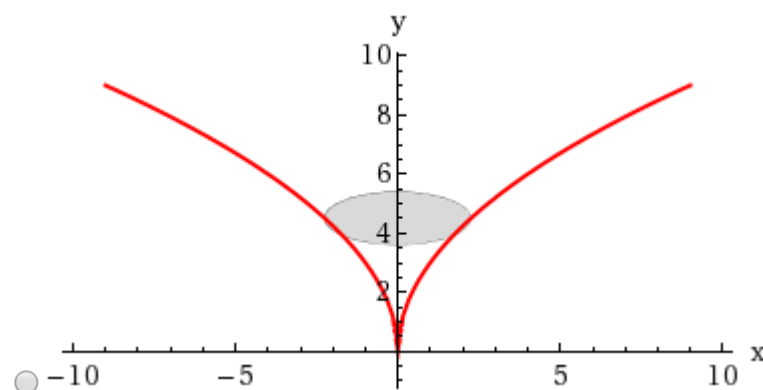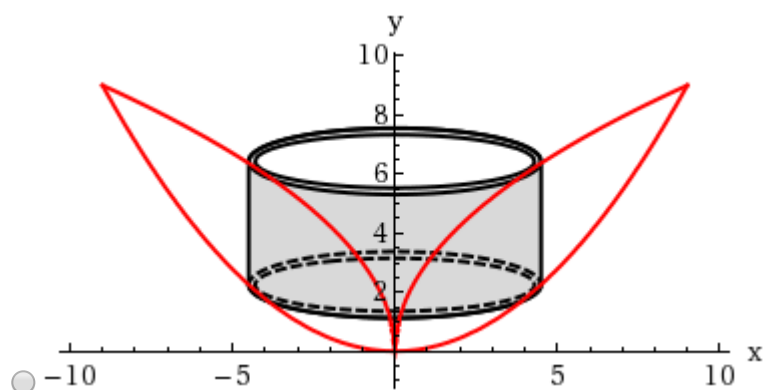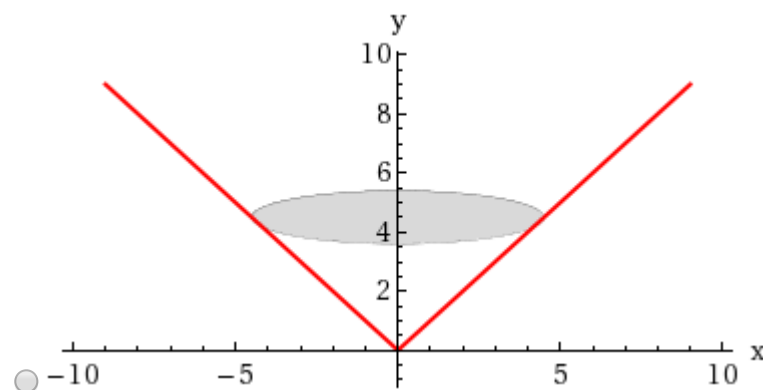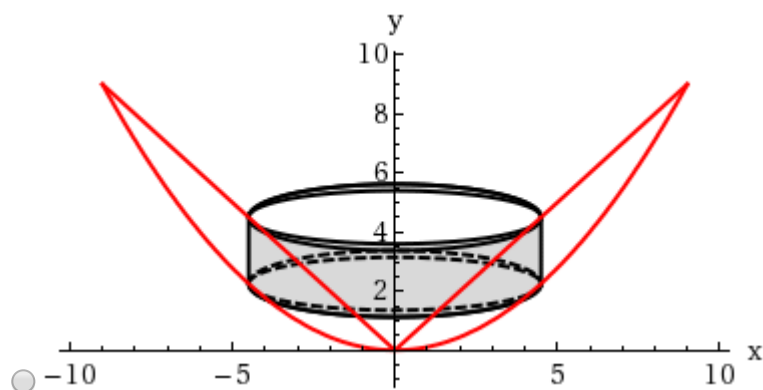
47.   **–/0 points**   **SCalcET8 6.3.012.**   🗎 **My Notes**   **Ask Your Teacher**

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

$$x = -3y^2 + 9y - 6, \quad x = 0$$

$V =$

48.   **–/0 points**   SCalcET8 6.3.013.   ⬚ **My Notes**   **Ask Your Teacher**

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

$$x = 3 + (y - 7)^2, \quad x = 19$$

$V =$

[   ]

[   ]

Sketch the region and a typical shell.

---
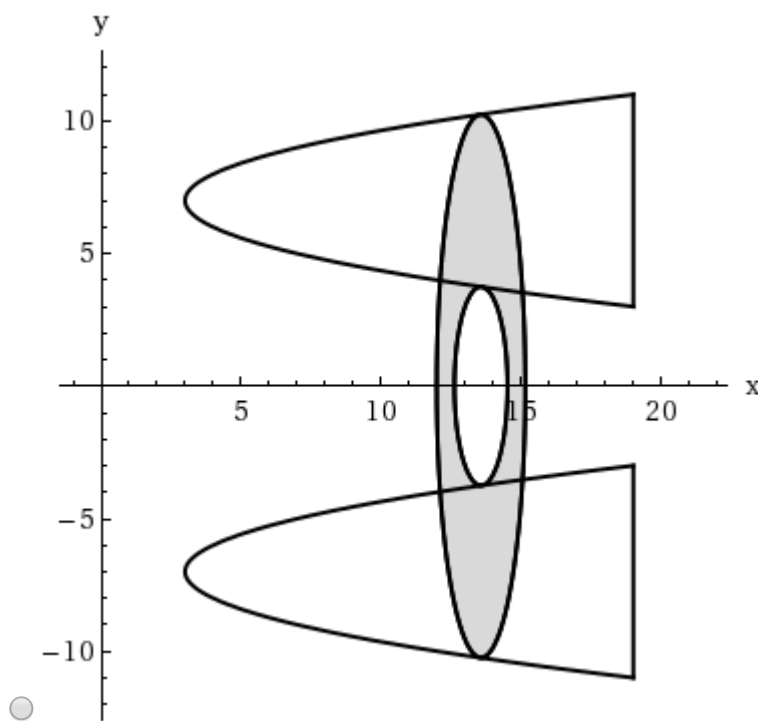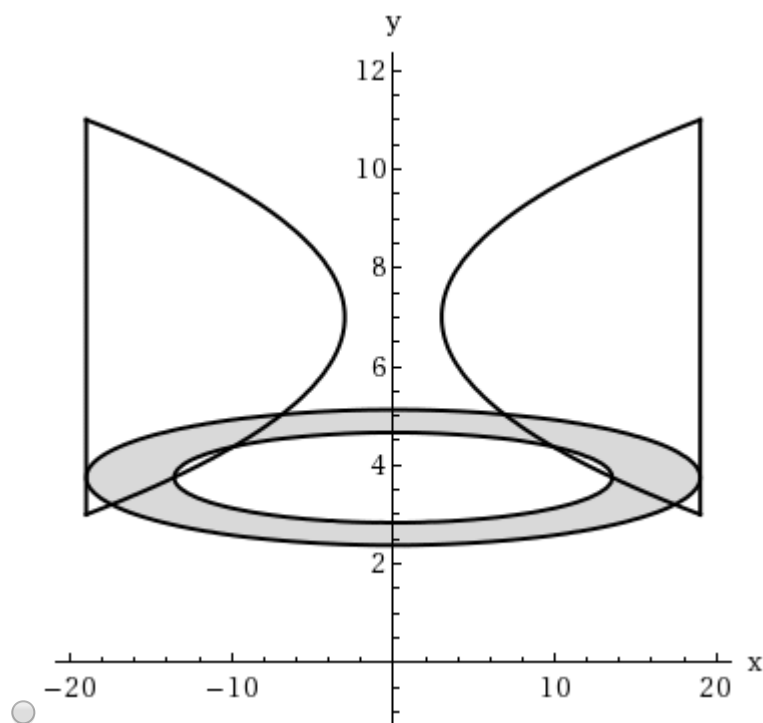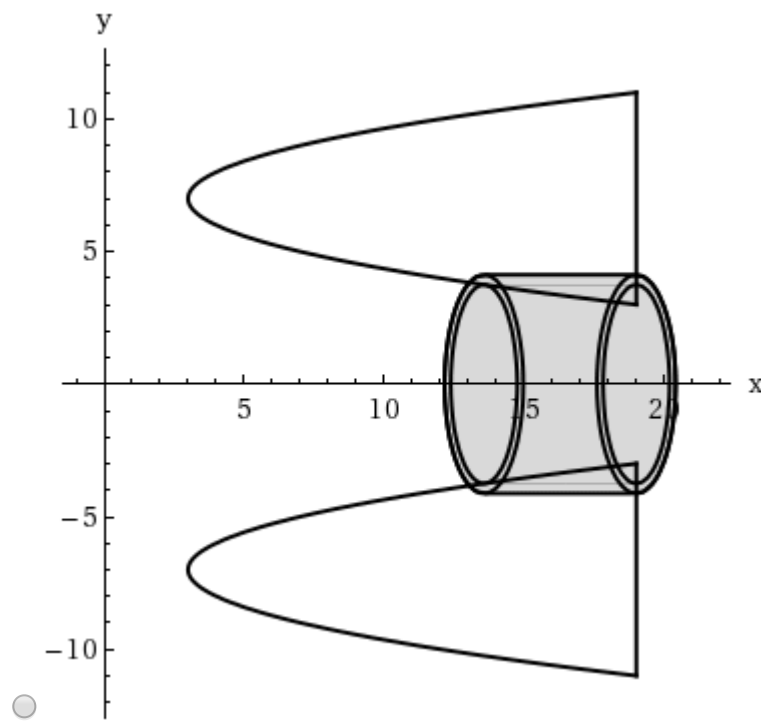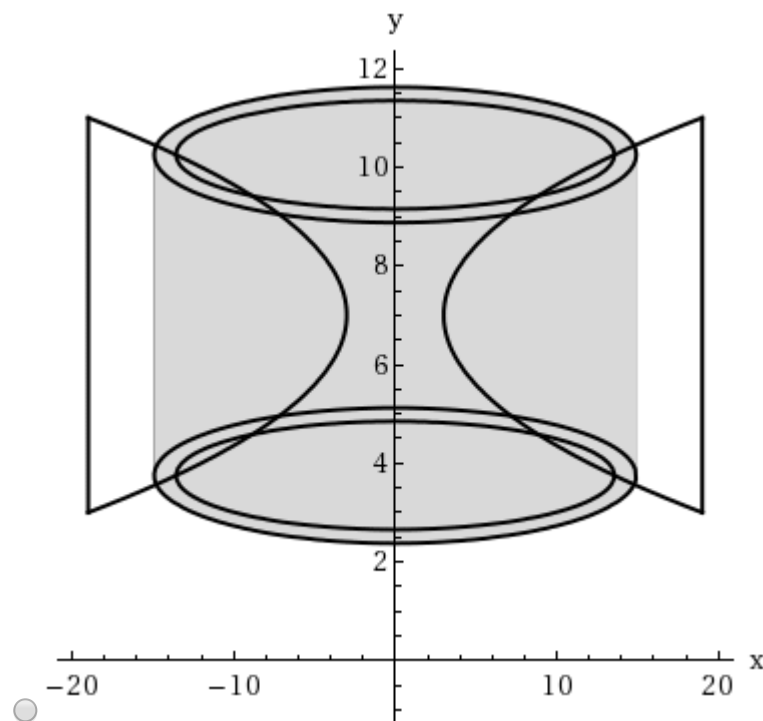
49.   **–/0 points**   **SCalcET8 6.3.029.**   ⤓ **My Notes**   **Ask Your Teacher**

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

$$\int_0^3 2\pi x^5 \, dx$$

○ The solid is obtained by rotating the region $0 \le y \le x^4$, $0 \le x \le 3$ about the y-axis using cylindrical shells.

○ The solid is obtained by rotating the region $0 \le y \le x^5$, $0 \le x \le 3$ about the y-axis using cylindrical shells.

○ The solid is obtained by rotating the region $0 \le y \le x^5$, $0 \le x \le 3$ about the x-axis using cylindrical shells.

○ The solid is obtained by rotating the region $0 \le y \le x^4$, $0 \le x \le 3$ about the x-axis using cylindrical shells.

○ The solid is obtained by rotating the region $0 \le y \le 2\pi$, $0 \le x^5 \le 3$ about the y-axis using cylindrical shells.

----

50.   **–/0 points**   SCalcET8 6.3.039.   My Notes   Ask Your Teacher

The region bounded by the given curves is rotated about the specified axis. Find the volume of the resulting solid by any method.

$$y^2 - x^2 = 4, \quad y = 3; \quad \text{about the } x\text{-axis}$$

----

51.   **–/0 points**   SCalcET8 6.5.001.   My Notes   Ask Your Teacher

Find the average value f_{ave} of the function f on the given interval.

$$f(x) = 3x^2 + 6x, \quad [-1, 3]$$

$f_{ave} =$

----

52.   **–/0 points**   **SCalcET8 6.5.004.**   🗈 **My Notes**   **Ask Your Teacher**

Find the average value g_{ave} of the function g on the given interval.

$$g(t) = \frac{t}{\sqrt{7 + t^2}}, \quad [3, 7]$$

$g_{ave} =$

----

53.   **–/0 points**   **SCalcET8 6.5.005.**   🗈 **My Notes**   **Ask Your Teacher**

Find the average value f_{ave} of the function f on the given interval.

$$f(t) = e^{\sin(t)} \cos(t), \quad [0, \pi/2]$$

$f_{ave} =$

---

54.   **–/0 points**   **SCalcET8 6.5.006.**   🗒 **My Notes**   **Ask Your Teacher**

Find the average value f_{ave} of the function f on the given interval.

$$f(x) = x^2/(x^3 + 14)^2, \quad [-2, 2]$$

$f_{ave} =$

[ ]

[ ]

---

55.   **–/0 points**   **SCalcET8 6.5.007.**   🗒 **My Notes**   **Ask Your Teacher**

Find the average value h_{ave} of the function h on the given interval.

$$h(x) = 9 \cos^4(x) \sin(x), \quad [0, \pi]$$

$h_{ave} =$

[ ]

[ ]

----

56.   **–/0 points**   **SCalcET8 6.5.008.**   🗒 **My Notes**   **Ask Your Teacher**

Find the average value h_{ave} of the function h on the given interval.

$h(u) = (\ln(u))/u, \quad [1, 5]$

$h_{ave} =$

----

57.   **–/0 points**   **SCalcET8 6.5.502.XP.**   🗒 **My Notes**   **Ask Your Teacher**

Find the average value f_{ave} of the function f on the given interval.

$f(x) = 2 \sin(2x), \quad [-\pi, \pi]$

$f_{ave} =$

---

58.   **–/0 points**   SCalcET8 7.1.003.MI.   ⬕ **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int x \cos(8x)\, dx$$

---

59.   **–/0 points**   SCalcET8 7.1.006.   ⬕ **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int (x - 9)\sin(\pi x)\, dx$$

---

60.   **–/0 points**   SCalcET8 7.1.007.   ⬕ **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int (x^2 + 2x) \cos(x)\, dx$$

---

61.   **–/0 points**   SCalcET8 7.1.010.   🗅 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int \ln(\sqrt{x})\, dx$$

---

62.   **–/0 points**   SCalcET8 7.1.011.   🗅 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int t^8 \ln(t)\, dt$$

---

63.   **–/0 points**   SCalcET8 7.1.015.   🗅 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int (\ln(x))^2\, dx$$

----

64.   **–/0 points**   **SCalcET8 7.1.017.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

Evaluate the integral.

$$\int e^{5\theta} \sin(6\theta) \, d\theta$$

----

65.   **–/0 points**   **SCalcET8 7.1.019.**   ⬐ **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use *C* for the constant of integration.)

$$\int 5z^3 e^z \, dz$$

---

66.   **–/0 points**   **SCalcET8 7.1.021.**   🗒 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int \frac{17xe^{2x}}{(1 + 2x)^2}\, dx$$

---

67.   **–/0 points**   **SCalcET8 7.1.030.**   🗒 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_{1}^{\sqrt{3}} 7 \arctan\left(\frac{1}{x}\right) dx$$

| 68. | –/0 points | SCalcET8 7.1.034. | 📝 My Notes | Ask Your Teacher |

Evaluate the integral.

$$\int_0^1 \frac{r^3}{\sqrt{16 + r^2}}\, dr$$

| 69. | –/0 points | SCalcET8 7.1.039. | 📝 My Notes | Ask Your Teacher |

First make a substitution and then use integration by parts to evaluate the integral.

$$\int_{\sqrt{\pi/2}}^{\sqrt{\pi}} 3\theta^3 \cos(\theta^2)\, d\theta$$

----

70.   **–/0 points**   **SCalcET8 7.1.061.**   🔖 **My Notes**   **Ask Your Teacher**

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

$y = \cos(\pi x/4)$, $y = 0$, $0 \le x \le 2$;   about the y-axis

$V =$

----

71.   **–/0 points**   **SCalcET8 7.1.062.**   🔖 **My Notes**   **Ask Your Teacher**

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

$y = 4e^x$, $y = 4e^{-x}$, $x = 1$;   about the y-axis

$V =$

72.   **–/0 points**   **SCalcET8 7.2.052.**

Evaluate the indefinite integral. (Use C for the constant of integration.)

$$\int 5 \sin^5(x) \cos^3(x) \, dx$$

Illustrate, and check that your answer is reasonable, by graphing both the integrand f and its antiderivative F (taking $C = 0$).

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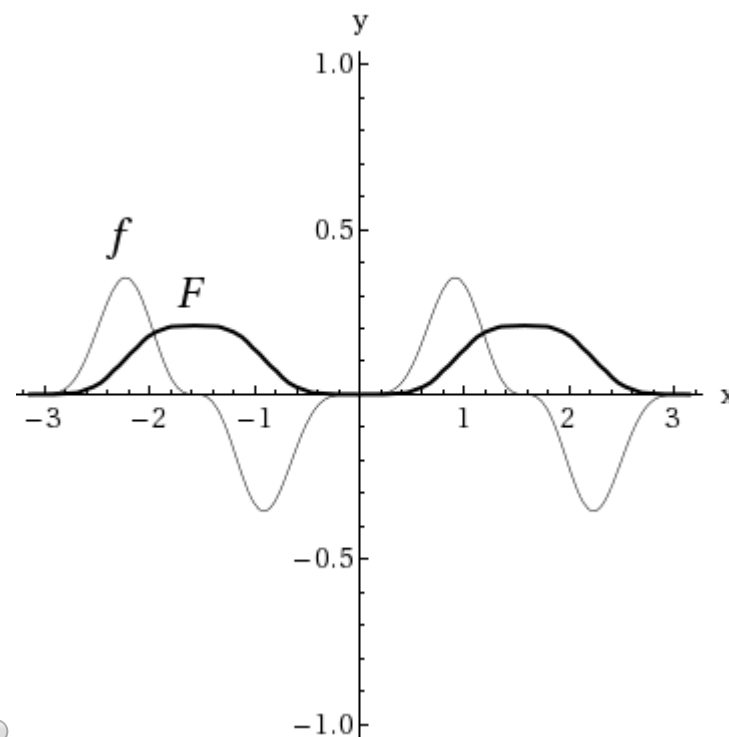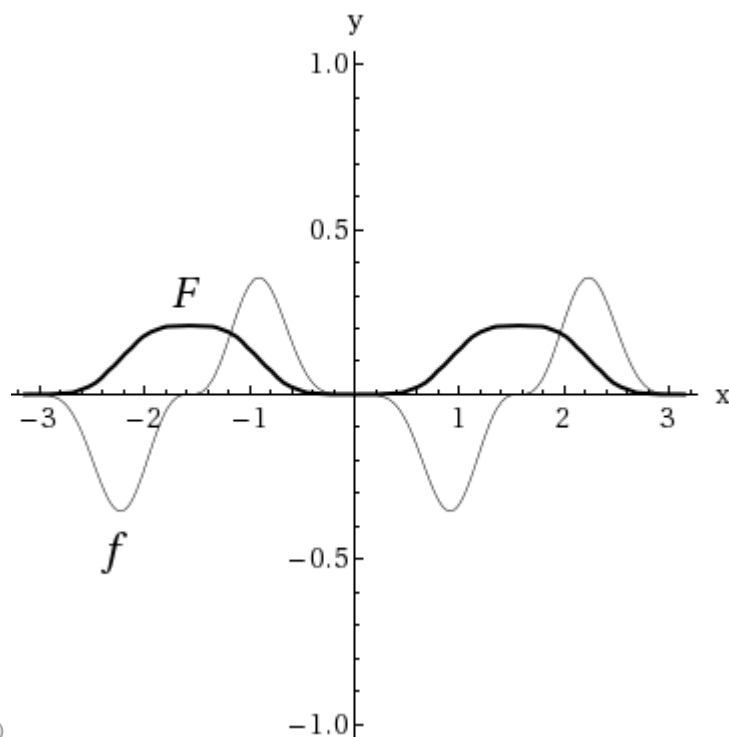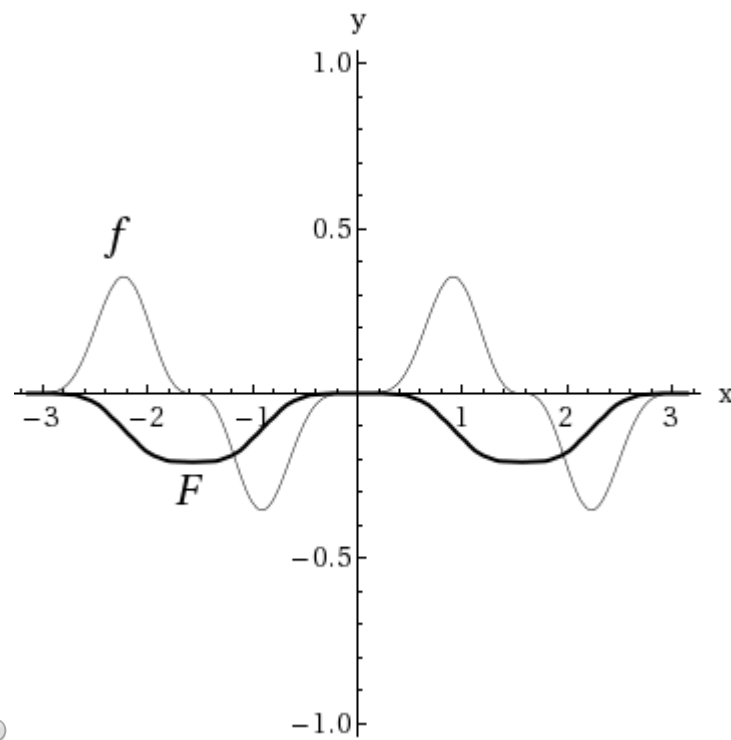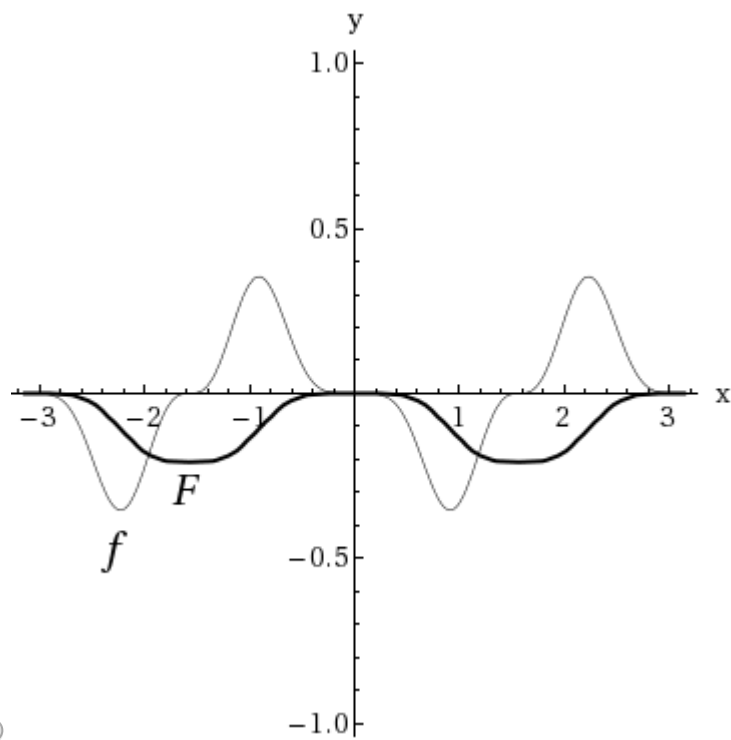
73.   **–/0 points**   **SCalcET8 7.2.054.**   ⌕ **My Notes**   **Ask Your Teacher**

Evaluate the indefinite integral. (Use C for the constant of integration.)

$$\int \sec^4\left(\frac{1}{2}x\right) dx$$

Illustrate, and check that your answer is reasonable, by graphing both the integrand f and its antiderivative F (taking $C = 0$).

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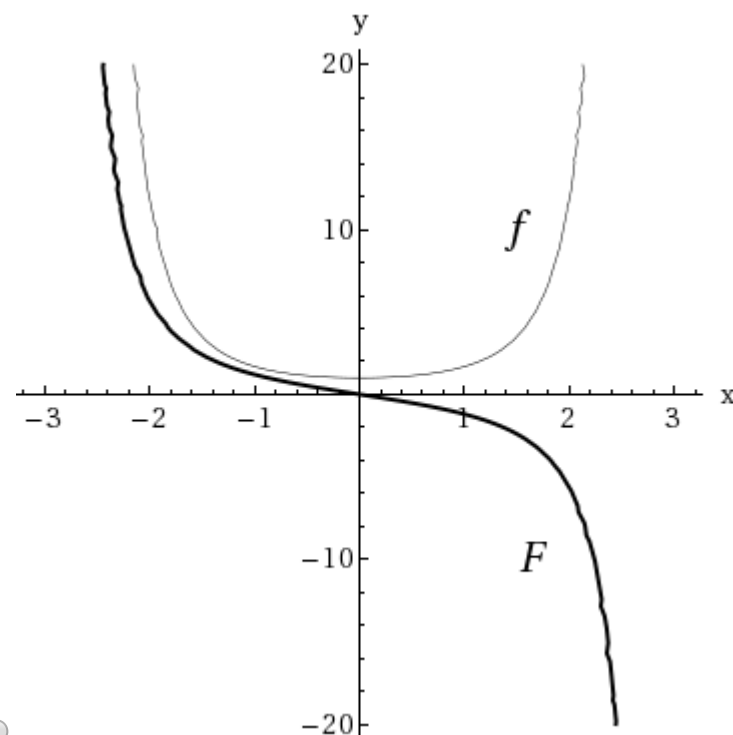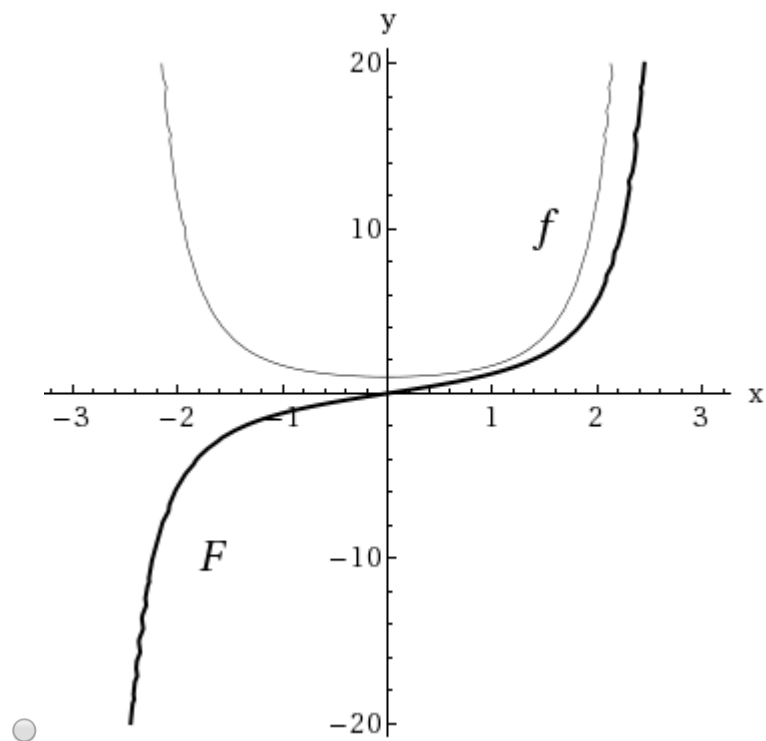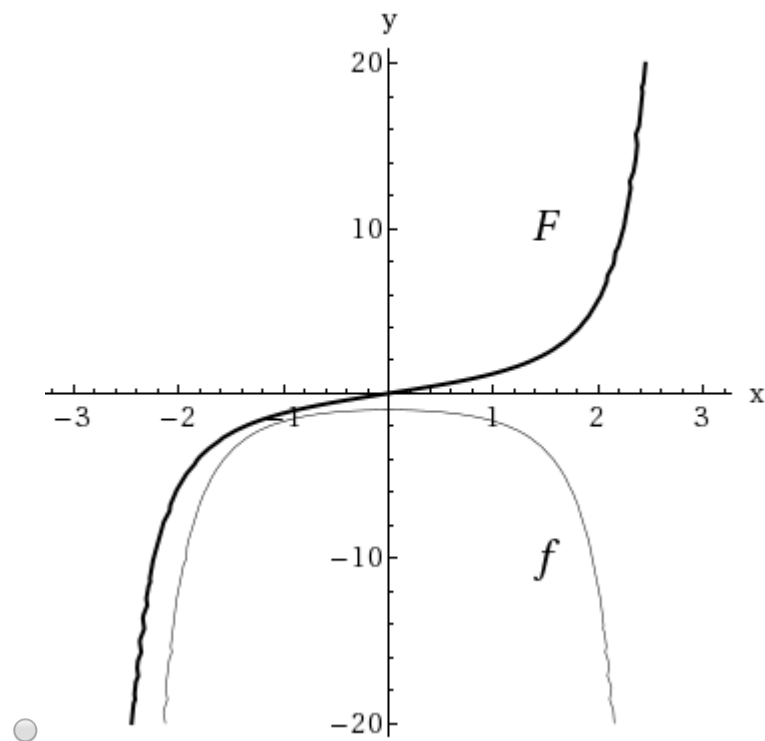
74.   **–/0 points**   **SCalcET8 7.2.056.**   📝 **My Notes**   **Ask Your Teacher**

Evaluate $11 \int \sin(x) \cos(x) \, dx$ by four methods.

(a) the substitution $u = \cos(x)$

○ $\dfrac{11}{4} \cos(2x) + C$

○ $\dfrac{11}{2} \sin^2(x) + C$

○ $\dfrac{11}{2} \cos^2(x) + C$

○ $\dfrac{11}{4} \sin(x) \cos(x) + C$

○ $\dfrac{11}{4} \sin(2x) + C$

(b) the substitution $u = \sin(x)$

○ $\dfrac{11}{4} \sin(2x) + C$

○ $\dfrac{11}{4} \cos(2x) + C$

○ $\dfrac{11}{4} \sin(x) \cos(x) + C$

○ $\dfrac{11}{2} \cos^2(x) + C$

○ $\dfrac{11}{2} \sin^2(x) + C$

(c) the identity $\sin(2x) = 2 \sin(x) \cos(x)$

○ $\dfrac{11}{4} \cos(2x) + C$

○ $\dfrac{11}{2}$ cos^2(x) + C

○ $\dfrac{11}{4}$ sin(x) cos(x) + C

○ $\dfrac{11}{4}$ sin(2x) + C

○ $\dfrac{11}{2}$ sin^2(x) + C

(d) integration by parts

○ $\dfrac{11}{4}$ sin(2x) + C

○ $\dfrac{11}{4}$ cos(2x) + C

○ $\dfrac{11}{2}$ sin^2(x) + C

○ $\dfrac{11}{4}$ sin(x) cos(x) + C

○ $\dfrac{11}{2}$ cos^2(x) + C

---

75.   **–/0 points**   **SCalcET8 7.2.061.**   ▢ **My Notes**   **Ask Your Teacher**

Find the volume V obtained by rotating the region bounded by the curves about the given axis.

$y = \sin(x), \ y = 0, \ \pi/2 \le x \le \pi;$ about the $x-$axis

$V =$

[ ]

[ ]

76.   **–/0 points**   **SCalcET8 7.2.064.**   🗈 **My Notes**   **Ask Your Teacher**

Find the volume V obtained by rotating the region bounded by the curves about the given axis.

$$y = 7 \sec(x), \quad y = 7 \cos(x), \quad 0 \le x \le \pi/3; \quad \text{about } y = -7$$

$V =$

----

77.   **–/0 points**   **SCalcET8 7.2.502.XP.**   🗈 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int \frac{8 \sin^3\left(\sqrt{x}\right)}{\sqrt{x}} \, dx$$

---

78.   –/0 points   SCalcET8 7.2.503.XP.   My Notes   Ask Your Teacher

Evaluate the integral. (Use C for the constant of integration.)

$$\int 2 \cos(\theta) \cos^5(\sin(\theta)) \, d\theta$$

---

79.   –/0 points   SCalcET8 7.2.509.XP.   My Notes   Ask Your Teacher

Evaluate the integral.

$$\int_0^{\pi/4} 2 \sec^4(\theta) \tan^4(\theta) \, d\theta$$

---

80.   **–/0 points**   SCalcET8 7.2.511.XP.   🗒 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int \csc^4(x)\, \cot^6(x)\, dx$$

---

81.   **–/0 points**   SCalcET8 7.2.514.XP.   🗒 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Remember to use absolute values where appropriate. Use C for the constant of integration.)

$$\int 7\, \frac{\cos(x) + \sin(x)}{\sin(2x)}\, dx$$

---

82.   **–/0 points**   SCalcET8 7.2.515.XP.   🗒 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use C for the constant of integration.)

$$\int 2\, \sin^6(x)\, \cos^3(x)\, dx$$

---

83.   **–/0 points**   SCalcET8 7.2.519.XP.   ☐ My Notes   Ask Your Teacher

Evaluate the integral. (Use C for the constant of integration.)

$$\int 5\sec^6(t)\, dt$$

---

84.   **–/0 points**   SCalcET8 7.2.520.XP.   ☐ My Notes   Ask Your Teacher

Evaluate the integral. (Use C for the constant of integration.)

$$\int 5\tan^3(2x)\sec^5(2x)\, dx$$

---

85.   **–/0 points**   SCalcET8 7.2.525.XP.   ☐ My Notes   Ask Your Teacher

Evaluate the integral. (Use C for the constant of integration.)

$$\int \sin^3(3x)\, dx$$
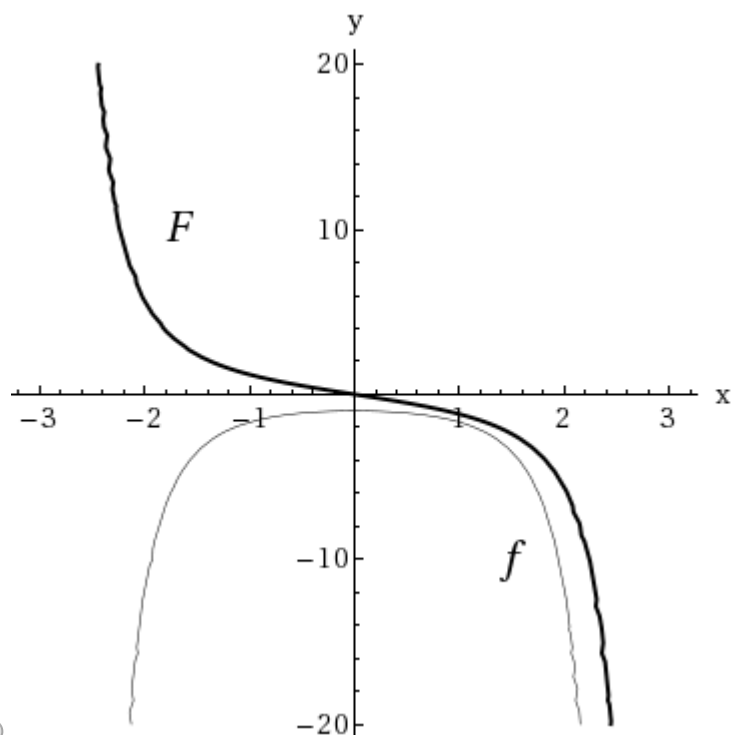
86.   **–/0 points**   SCalcET8 7.2.530.XP.   📄 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_0^\pi 7 \sin^4(3t)\, dt$$

87.   **–/0 points**   **SCalcET8 7.2.AE.002.**   ⬚ **My Notes**   **Ask Your Teacher**
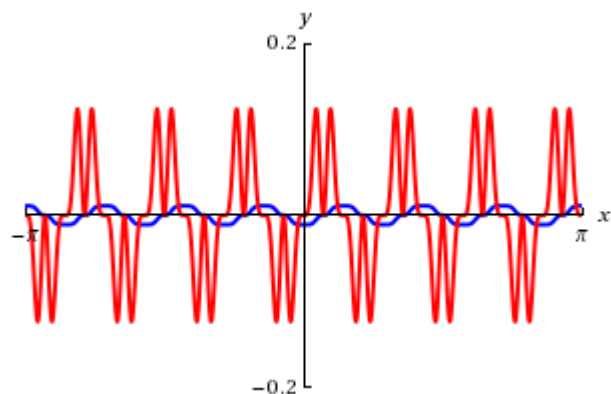
This figure shows the graphs of the integrand $\sin^5(7x)\cos^2(7x)$ and its indefinite integral (with $C = 0$). Which is which?

[Video Example](#) 🔊))

EXAMPLE 2   Find $\displaystyle\int \sin^5(7x)\cos^2(7x)\,dx$.

SOLUTION   We could convert $\cos^2(7x)$ to $1 - \sin^2(7x)$, but we would be left with an expression in terms of $\sin(7x)$ with no extra $\cos(7x)$ factor. Instead, we separate a single sine factor and rewrite the remaining $\sin^4(7x)$ factor in terms of $\cos(7x)$:

$$\sin^5(7x)\cos^2(7x) = (\sin^2(7x))^2\cos^2(7x)\sin(7x)$$

$$= (1 - \cos^2(7x))^2\cos^2(7x)\sin(7x).$$

$du =$

⬚

⬚

Substituting $u = \cos(7x)$, we have dx ⬚ and so

$$\int \sin^5(7x)\cos^2(7x)\,dx = \int (\sin^2(7x))^2\cos^2(7x)\sin(7x)\,dx$$

$$= \int (1 - \cos^2(7x))^2\cos^2(7x)\sin(7x)\,dx$$

$$= \int (1 - u^2)^2u^2\left(\boxed{}\,du\right)$$

$$=$$

$$-\frac{1}{7}\int\left(u^2 - \right.$$

$$\boxed{}$$

$$\boxed{}$$

$$\left. + u^6\right)du$$

$$=$$

$$-\frac{1}{7}\left(\frac{u^3}{3} - \right.$$

$$\boxed{}$$

$$\boxed{}$$

$$\left. + \frac{u^7}{7}\right) + C$$

$$=$$

$$-\frac{\cos^3(7x)}{21} +$$

$$\boxed{}$$

$$\boxed{}$$

$$-\frac{\cos^7(7x)}{49} + C.$$

----

88.   **–/0 points**   **SCalcET8 7.3.002.**   ⬚ **My Notes**   **Ask Your Teacher**

Evaluate the integral using the indicated trigonometric substitution. (Use C for the constant of integration.)

$$\int \frac{x^3}{\sqrt{x^2 + 16}}\, dx, \qquad x = 4 \tan(\theta)$$

[ ]

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Sketch and label the associated right triangle.
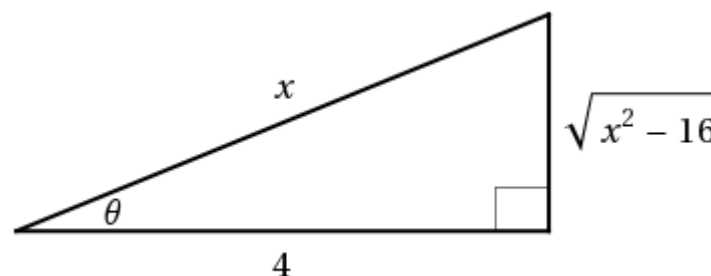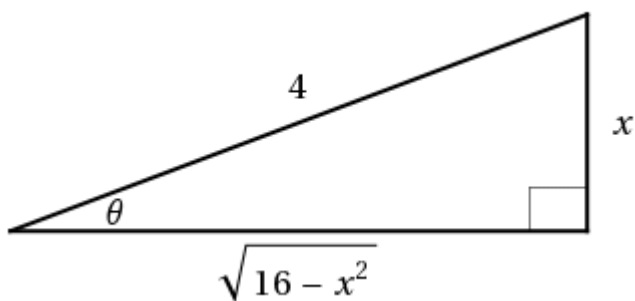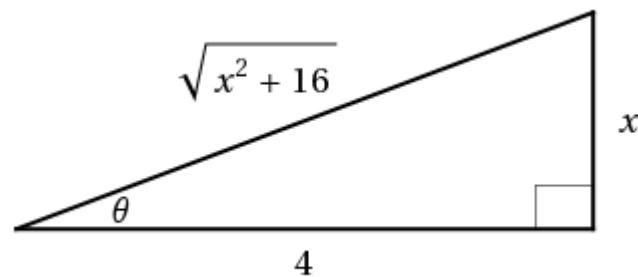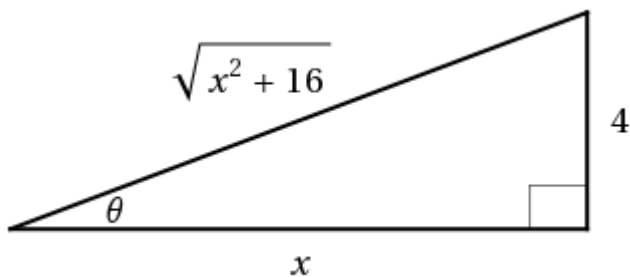
○

○

○

○

Evaluate the integral using the indicated trigonometric substitution. (Use C for the constant of integration.)

$$\int \frac{\sqrt{x^2 - 4}}{x}\, dx, \qquad x = 2\sec(\theta)$$

Sketch and label the associated right triangle.

○

○

○

○
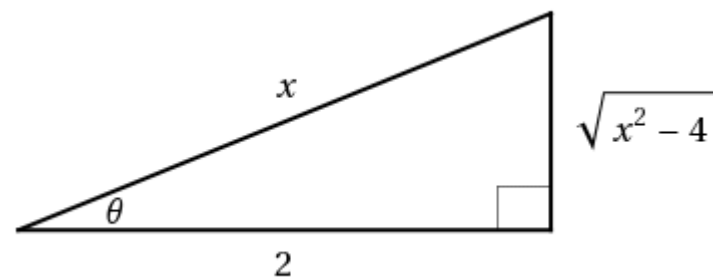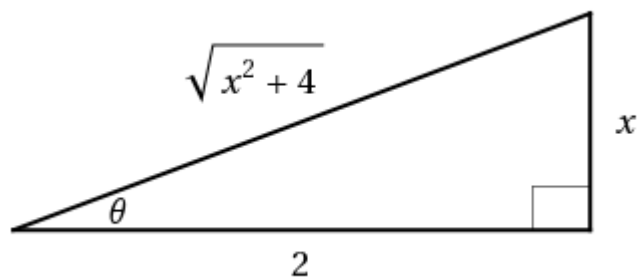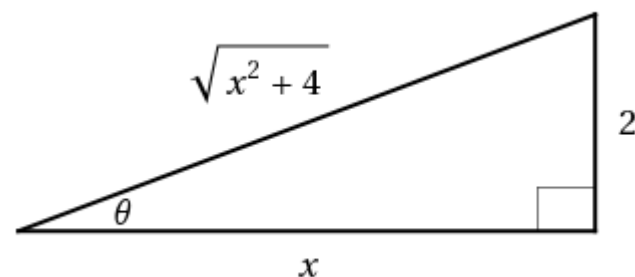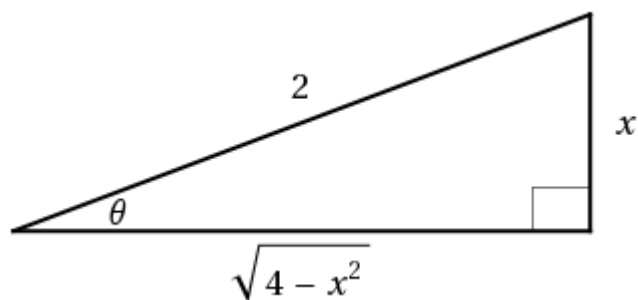
| 90. | **–/0 points** | **SCalcET8 7.3.004.** | 🗒 **My Notes** | **Ask Your Teacher** |

Evaluate the integral. (Use C for the constant of integration.)

$$\int \frac{x^2}{\sqrt{9 - x^2}}\, dx$$

| 91. | **–/0 points** | **SCalcET8 7.3.007.** | 🗒 **My Notes** | **Ask Your Teacher** |

Evaluate the integral.

$$2 \int_0^a \frac{dx}{(a^2 + x^2)^{3/2}}, \quad a > 0$$

---

92.   **–/0 points**   **SCalcET8 7.3.012.**   ⬚ **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_0^7 \frac{dt}{\sqrt{49 + t^2}}$$

---

93.   **–/0 points**   **SCalcET8 7.3.013.**   ⬚ **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Use *C* for the constant of integration.)

$$\int \frac{\sqrt{x^2 - 9}}{x^3} \, dx$$

---

94.   **–/0 points**   SCalcET8 7.3.016.   🗅 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_{\sqrt{2}/2}^{1} \frac{dx}{x^5 \sqrt{4x^2 - 1}}$$

---

95.   **–/0 points**   SCalcET8 7.3.019.   🗅 **My Notes**   **Ask Your Teacher**

Evaluate the integral. (Remember to use absolute values where appropriate. Use C for the constant of integration.)

$$\int \frac{\sqrt{36 + x^2}}{x} \, dx$$

---

96.   **–/0 points**   SCalcET8 7.3.022.   📝 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_0^5 \sqrt{x^2 + 25}\, dx$$

---

97.   **–/0 points**   SCalcET8 7.3.030.   📝 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$\int_0^{\pi/2} \frac{\cos(t)}{\sqrt{1 + \sin^2(t)}}\, dt$$

---

98.   **–/0 points**   SCalcET8 7.3.033.   📝 **My Notes**   **Ask Your Teacher**

Find the average value of $f(x) = \dfrac{\sqrt{x^2 - 1}}{x}$, $1 \le x \le 10$.

---

99.   **–/0 points**   SCalcET8 7.3.501.XP.   📄 **My Notes**   **Ask Your Teacher**

Evaluate the integral.

$$16 \int_0^1 x^3 \sqrt{1 - x^2} \, dx$$

100.   **–/0 points**   **SCalcET8 7.8.001.**   ⬀ **My Notes**   **Ask Your Teacher**

Explain why each of the following integrals is improper.

(a) $\displaystyle\int_9^{10} \frac{x}{x-9}\,dx$

    ○ Since the integral has an infinite interval of integration, it is a Type 1 improper integral.

    ○ Since the integral has an infinite discontinuity, it is a Type 2 improper integral.

    ○ The integral is a proper integral.

(b) $\displaystyle\int_0^{\infty} \frac{1}{1+x^3}\,dx$

    ○ Since the integral has an infinite interval of integration, it is a Type 1 improper integral.

    ○ Since the integral has an infinite discontinuity, it is a Type 2 improper integral.

    ○ The integral is a proper integral.

(c) $\displaystyle\int_{-\infty}^{\infty} x^2 e^{-x^2}\,dx$

    ○ Since the integral has an infinite interval of integration, it is a Type 1 improper integral.

    ○ Since the integral has an infinite discontinuity, it is a Type 2 improper integral.

    ○ The integral is a proper integral.

(d) $\displaystyle\int_0^{\pi/4} \cot(x)\,dx$

    ○ Since the integral has an infinite interval of integration, it is a Type 1 improper integral.

    ○ Since the integral has an infinite discontinuity, it is a Type 2 improper integral.

○   The integral is a proper integral.

101.	–/0 points	SCalcET8 7.8.006.	🗈 My Notes	Ask Your Teacher

Determine whether the integral is convergent or divergent.

$$\int_0^\infty \frac{1}{\sqrt[6]{1+x}}\, dx$$

○   convergent

○   divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

----

102. **–/0 points** **SCalcET8 7.8.011.** 📄 **My Notes** **Ask Your Teacher**

Determine whether the integral is convergent or divergent.

$$\int_0^\infty \frac{x^2}{\sqrt{9 + x^3}} \, dx$$

○ convergent

○ divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

----

103. **–/0 points** **SCalcET8 7.8.014.** 📄 **My Notes** **Ask Your Teacher**

Determine whether the integral is convergent or divergent.

$$\int_7^\infty \frac{e^{-1/x}}{x^2} \, dx$$

○ convergent

○ divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

104.   **–/0 points**   **SCalcET8 7.8.017.**   ⬐ **My Notes**   **Ask Your Teacher**

Determine whether the integral is convergent or divergent.

$$\int_4^\infty \frac{1}{x^2 + x}\, dx$$

○ convergent

○ divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

[   ]

[   ]

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105.   **–/0 points**   **SCalcET8 7.8.028.**   ⬐ **My Notes**   **Ask Your Teacher**

Determine whether the integral is convergent or divergent.

$$\int_0^{11} \frac{1}{\sqrt[3]{11 - x}}\, dx$$

○ convergent

○ divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

[   ]

[   ]

----

106.   **–/0 points**   **SCalcET8 7.8.041.**   ▣ **My Notes**   **Ask Your Teacher**

Sketch the region.

$$S = \left\{ (x, y) \mid x \geq 1, \; 0 \leq y \leq e^{-x} \right\}$$
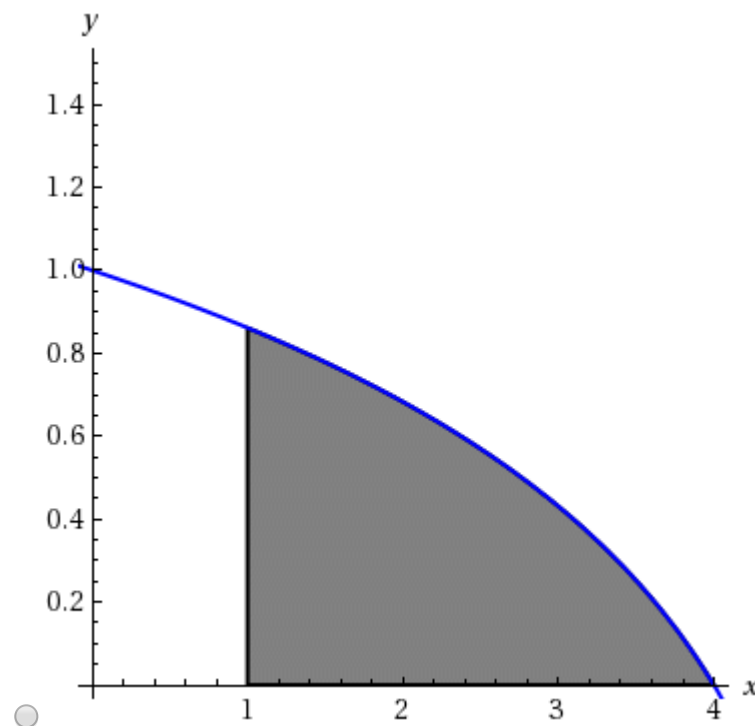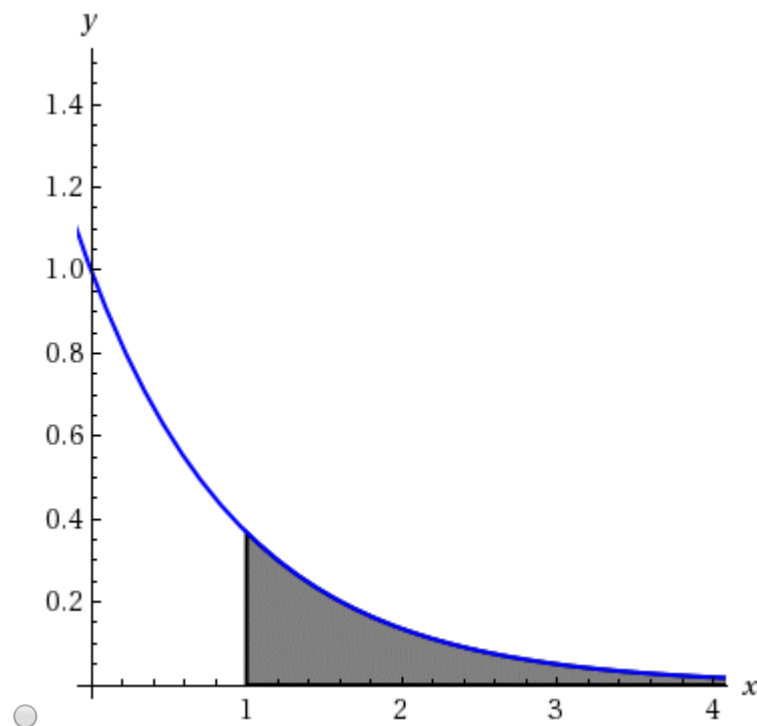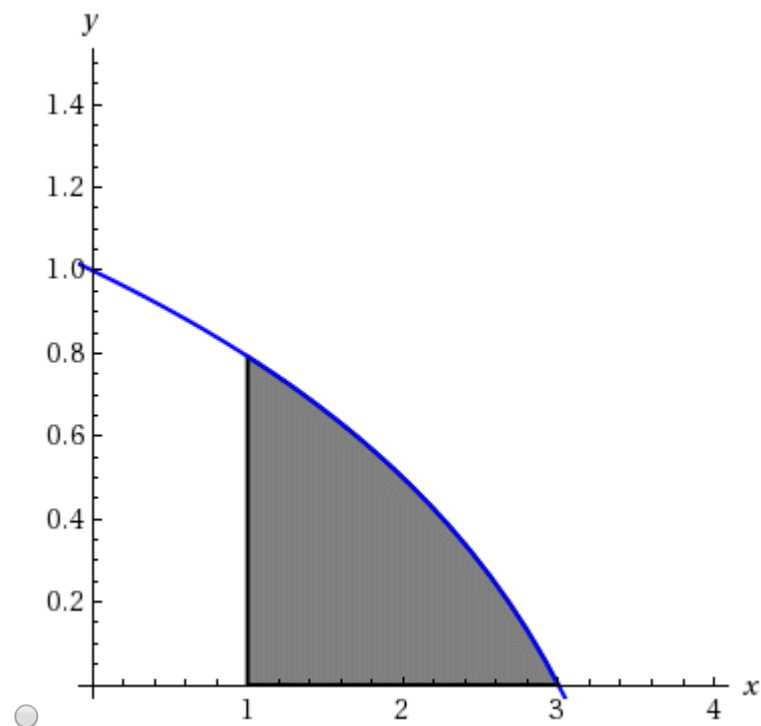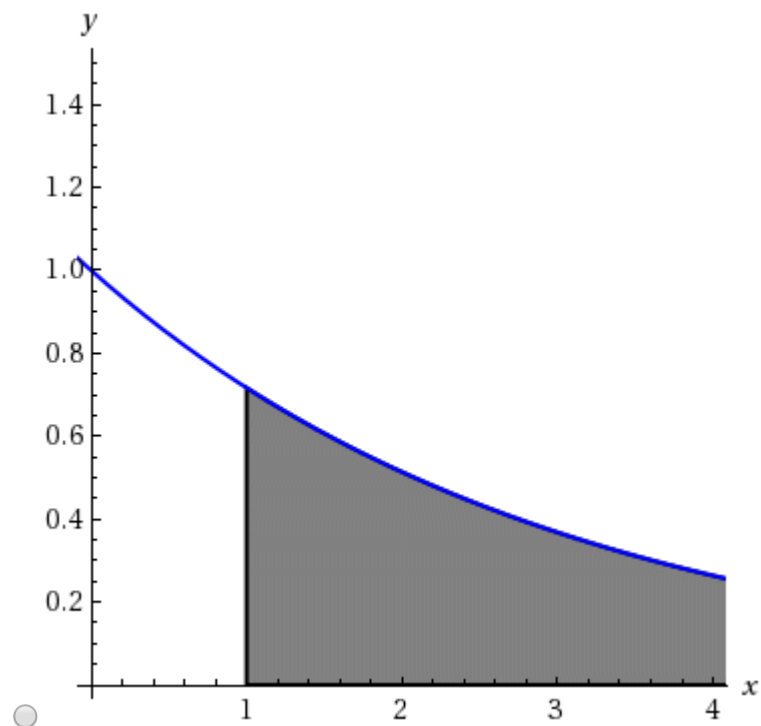
Find its area (if the area is finite). (If the area is not finite, enter ∞.)

----

107.   **–/0 points**   **SCalcET8 7.8.055.**   ⬜ **My Notes**   **Ask Your Teacher**

The integral

$$\int_0^\infty \frac{2}{\sqrt{x}(1 + x)}\, dx$$

is improper for two reasons: The interval $[0, \infty)$ is infinite and the integrand has an infinite discontinuity at 0. Evaluate it by expressing it as a sum of improper integrals of <u>Type 2</u> and <u>Type 1</u> as follows.

$$\int_0^\infty \frac{2}{\sqrt{x}(1 + x)}\, dx = \int_0^1 \frac{2}{\sqrt{x}(1 + x)}\, dx + \int_1^\infty \frac{2}{\sqrt{x}(1 + x)}\, dx$$

----

108.   **–/0 points**   **SCalcET8 7.8.503.XP.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

Determine whether the integral is convergent or divergent. If it is convergent, evaluate it.

$$\int_{-\infty}^{\infty} x^9 e^{-x^{10}}\, dx$$

----

109.   **–/0 points**   **SCalcET8 7.8.506.XP.**   📄 **My Notes**   **Ask Your Teacher**

Determine whether the integral is convergent or divergent.

$$\int_{e}^{\infty} \frac{79}{x(\ln(x))^3} \, dx$$

○ convergent

○ divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

----

110.   **–/0 points**   **SCalcET8 7.8.525.XP.**   📄 **My Notes**   **Ask Your Teacher**

Determine whether the integral is convergent or divergent.

$$\int_{0}^{13} \frac{dx}{x\sqrt{x}}$$

○ convergent

○ divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)
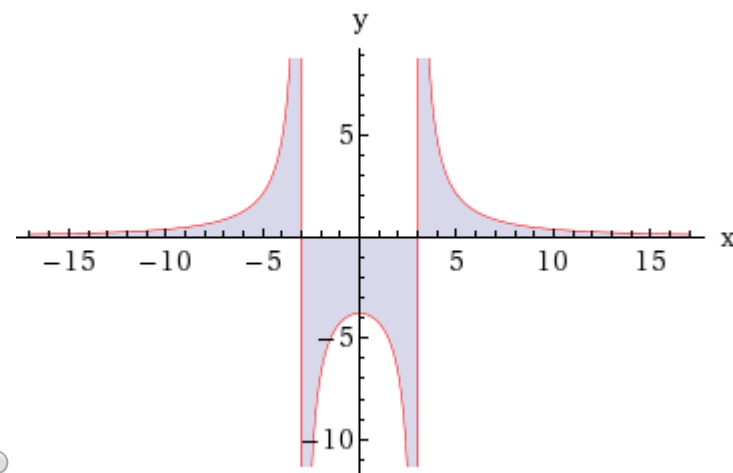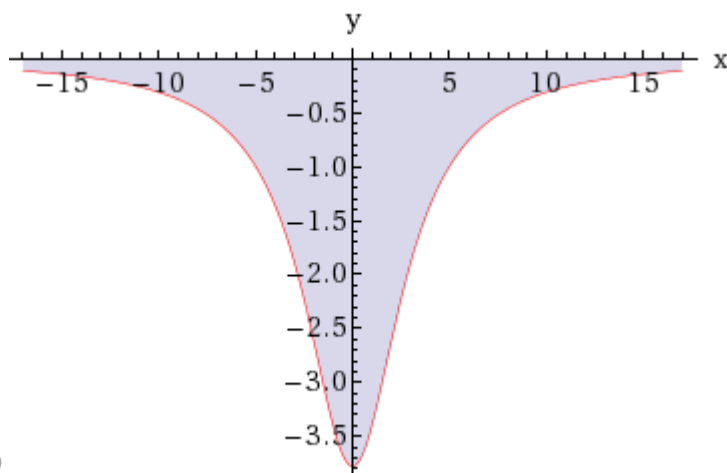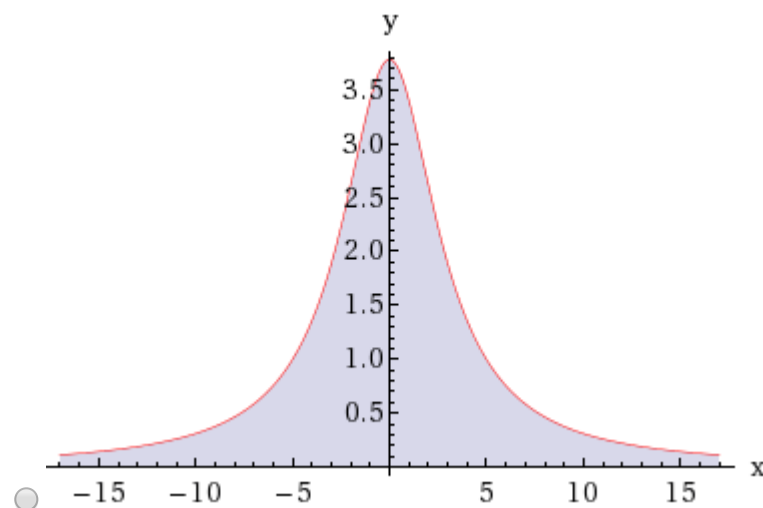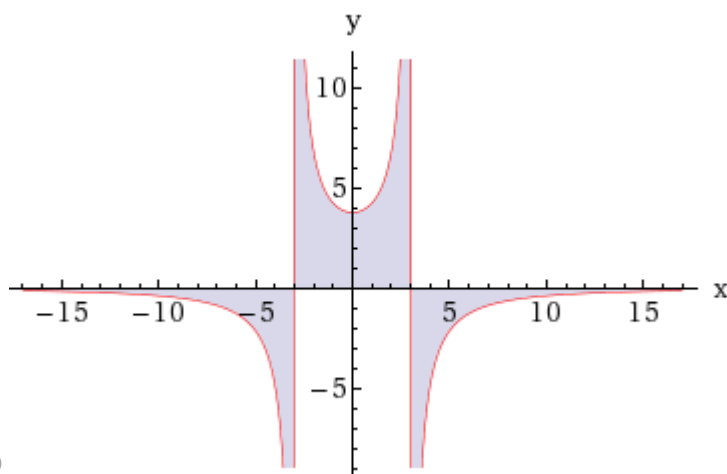
111.   **–/0 points**   SCalcET8 7.8.536.XP.   🗌 **My Notes**   **Ask Your Teacher**

Sketch the region.

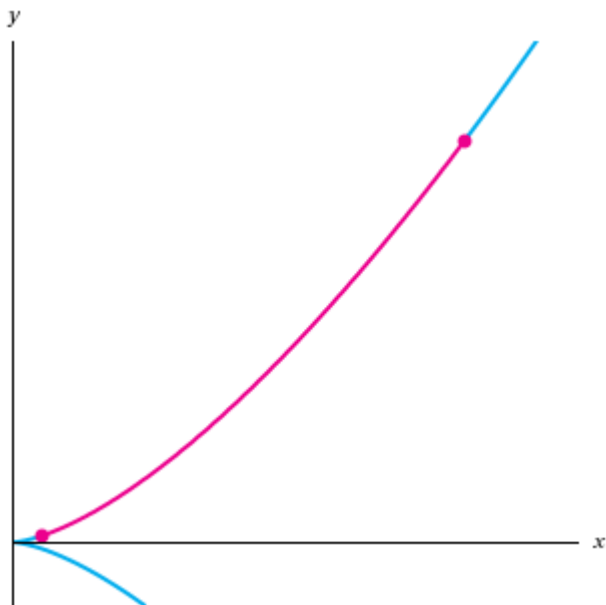$$S = \left\{ (x, y) \,\middle|\, 0 \le y \le \frac{34}{x^2 + 9} \right\}$$

Find its area.

----

112.   **–/0 points**   **SCalcET8 8.1.AE.001.**   📄 **My Notes**   **Ask Your Teacher**

EXAMPLE 1   Find the length of the arc of the semicubical parabola $y^2 = x^3$ between the points (1, 1) and (16, 64). (See the figure.)

SOLUTION   For the top half of the curve we have

$$y = x^{3/2} \qquad \frac{dy}{dx} =$$

and so the arc length formula gives

$$L = \int_1^{16} \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx = \int_1^{16} \sqrt{\rule{2cm}{0pt}}\; dx.$$

$u = $

$du = $

If we substitute ,   then dx.   When $x = 1$, $u = $; when $x = 16$, $u = $. Therefore,

$$L = \frac{4}{9}\int_{13/4}^{37} \sqrt{u}\; du$$

$$=$$

$$\Big]_{13/4}^{37}$$

$$=$$

As a check on our answer to this example, notice from the figure that the arc length ought to be slightly larger than the distance from (1, 1) to (16, 64), which is

$$\sqrt{4194} \approx 64.761099$$

According to our calculation in the example, we have

$$L = \frac{8}{27}\left(37^{3/2} - (13/4)^{3/2}\right) \approx 64.949094$$

Sure enough, this is a bit greater than the length of the line segment.

----

113.   **–/0 points**   **SCalcET8 8.1.502.XP.**   🗋 **My Notes**   **Ask Your Teacher**

Set up, but do not evaluate, an integral for the length of the curve.

$$x = y + y^5, \quad 2 \le y \le 3$$

○ $\displaystyle\int_{2}^{3} \sqrt{y + y^5}\, dy$

○ $\displaystyle\int_{34}^{246} \sqrt{1 + (1 + 5x^4)^2}\, dx$

○ $\displaystyle\int_{2}^{3} \left(1 + (1 + 5y^4)^2\right) dy$

○ $\displaystyle\int_{2}^{3} \sqrt{1 + (1 + 5y^4)^2}\, dy$

○ $\displaystyle\int_{34}^{246} \left(1 + (1 + 5x^4)^2\right) dx$

---

114.   **–/0 points**   **SCalcET8 8.1.503.XP.**   📝 **My Notes**   **Ask Your Teacher**

Find the exact length of the curve.

$$y = e^x, \quad 0 \le x \le 9$$

---

115.   **–/0 points**   **SCalcET8 8.1.504.XP.**   📝 **My Notes**   **Ask Your Teacher**

Find the exact length of the curve.

$$y = \ln\left(\frac{e^x + 1}{e^x - 1}\right), \quad a \le x \le b, \quad a > 0$$

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116.   **–/0 points**   **SCalcET8 8.1.037.**   📝 **My Notes**   **Ask Your Teacher**

Find the arc length function for the curve $y = \sin^{-1}(x) + \sqrt{1 - x^2}$ with starting point $(0, 1)$.

$s(x) =$

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