# CENGAGE | WEBASSIGN

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Calendar
      My eBooks

←   MC 006, section B, Fall 2019

🎓 INSTRUCTOR

**Christiaan Ketelaar**
Universidad Francisco Marroquin

## 5.4 &Aacute;rea, Desplazamiento y Distancia (Homework)

### Current Score

| QUESTION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINTS | 2/2 ✔ | 2/2 ✔ | 1/1 ✔ | 2/2 ✔ | 2/0 ⭐ | 2/0 ⭐ | 1/1 ✔ | 2/0 ⭐ | 2/2 ✔ | 1/1 ✔ | 2/2 ✔ | 4/3 ✔ |

**TOTAL SCORE**

| 23/16 | 143.8% |
|---|---|

### 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.
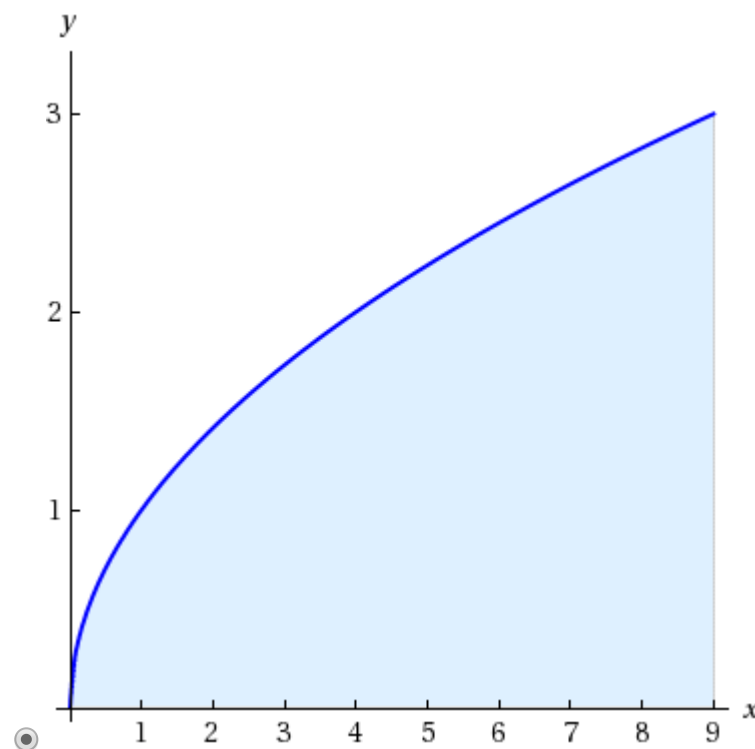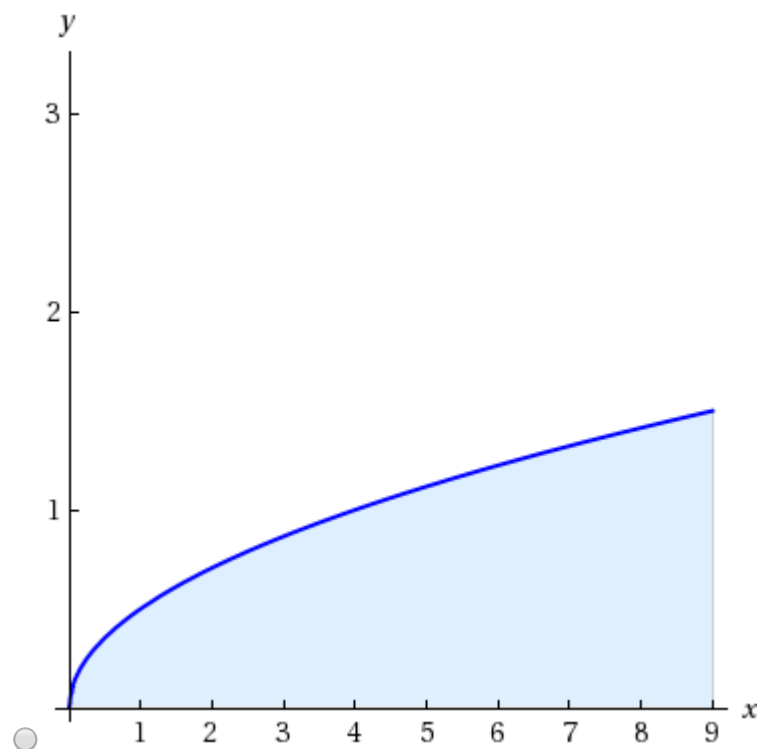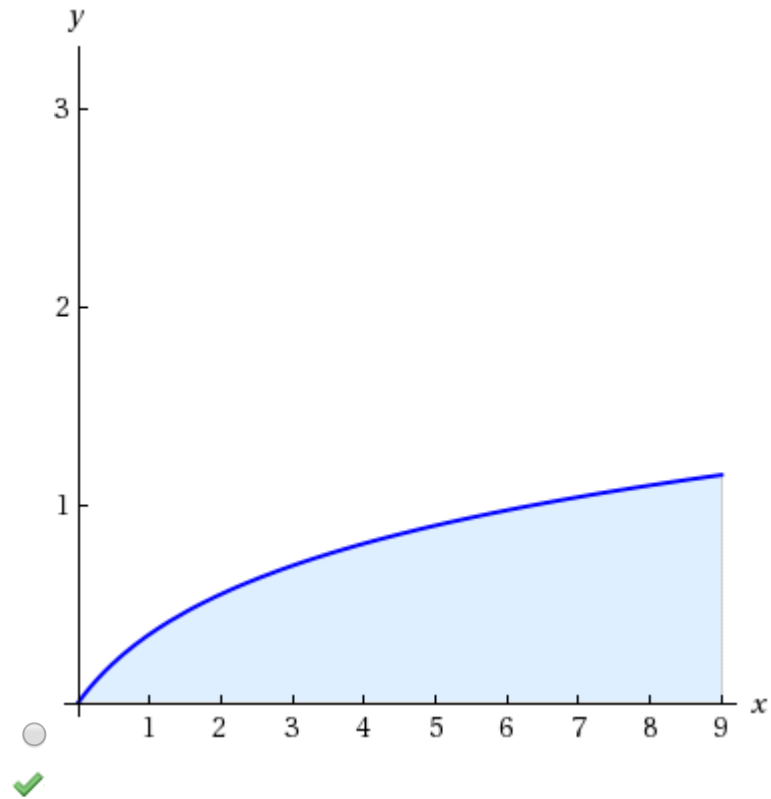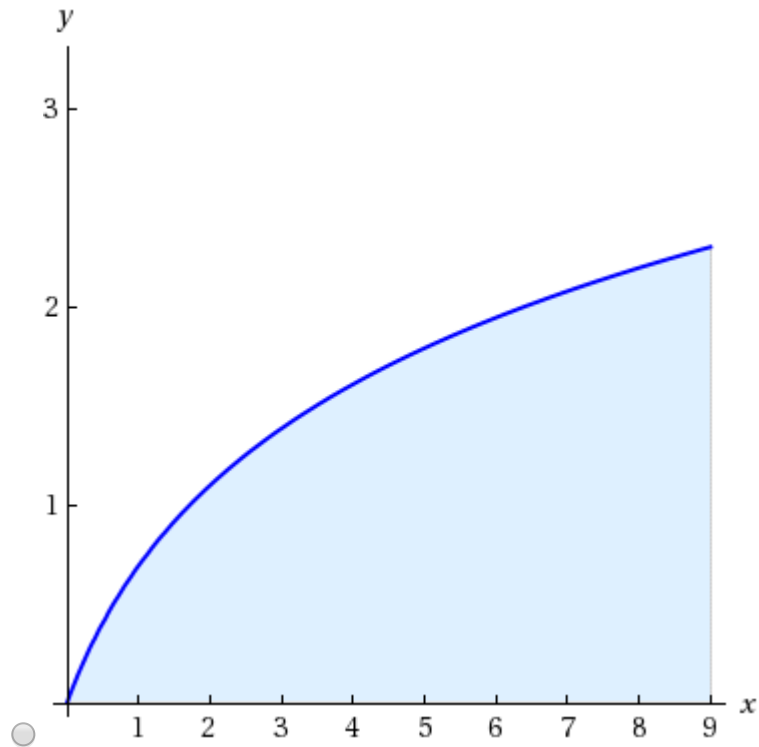
### Assignment Scoring

Your last submission is used for your score.

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1.   **2/2 points   Previous Answers**   SCalcET8 5.3.045.        ⬚ **My Notes**   **Ask Your Teacher**

Sketch the region enclosed by the given curves. (A graphing calculator is recommended.)
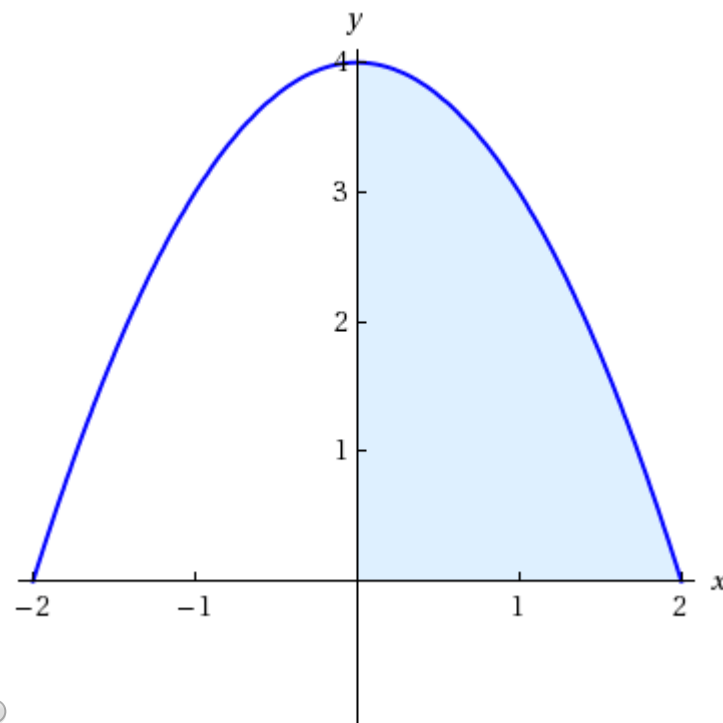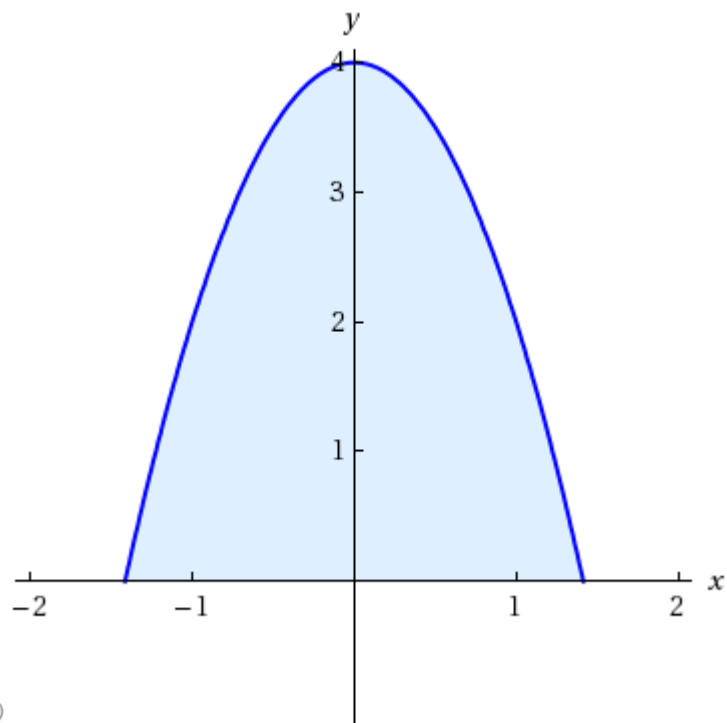
$$y = \sqrt{x}, \quad y = 0, \quad x = 9$$
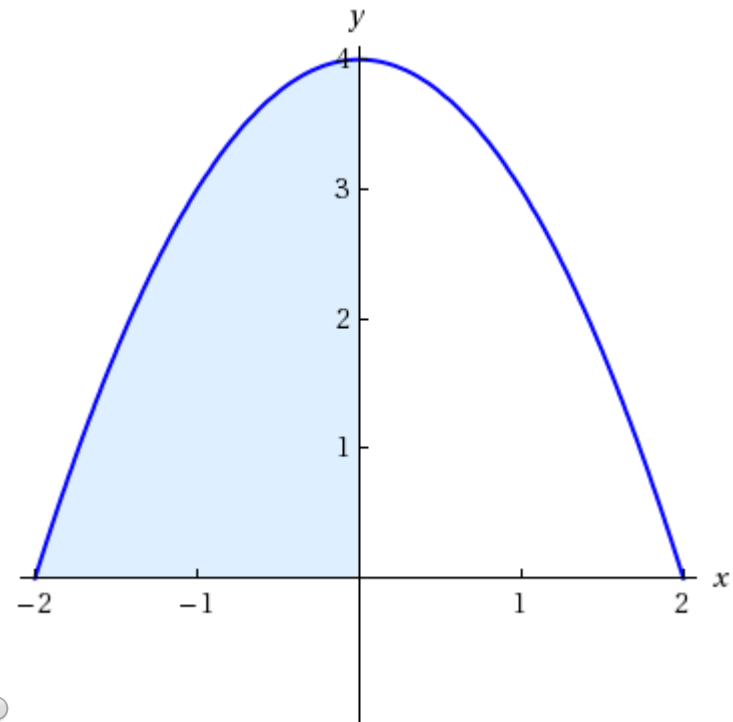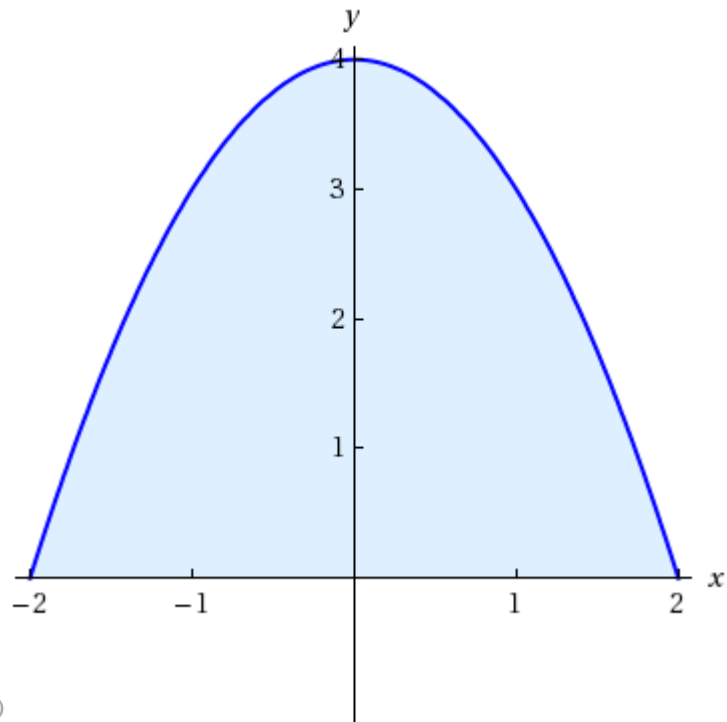
Calculate its area.

543

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2.          **2/2 points**   **Previous Answers**     **SCalcET8 5.3.047.**                               ◿ **My Notes**      **Ask Your Teacher**

Sketch the region enclosed by the given curves. (A graphing calculator is recommended.)

$$y = 4 - x^2, \quad y = 0$$

Calculate its area.

323

✔

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**3.**    **1/1 points**   **Previous Answers**    **SCalcET8 5.3.052.**                    📝 **My Notes**      **Ask Your Teacher**

Use a graph to give a rough estimate of the area of the region that lies beneath the given curve. Then find the exact area.

$$y = \sec^2(x), \quad 0 \le x \le \pi/3$$

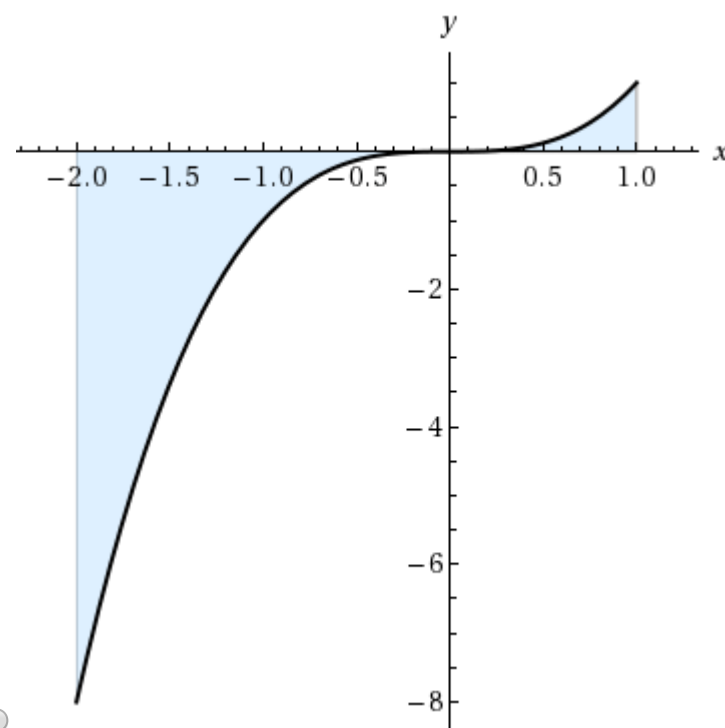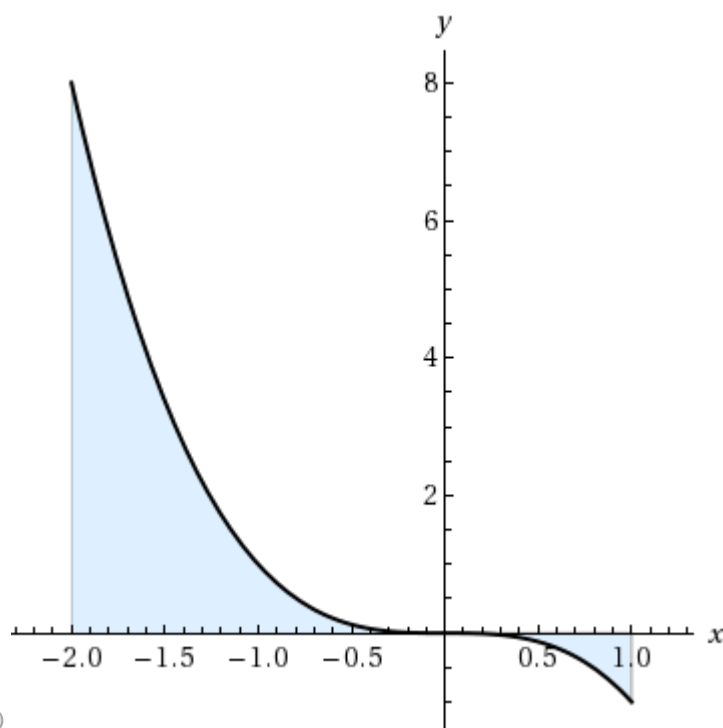[                    ]$\sqrt{3}$

[                    ]

✔️

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**4.**     **2/2 points**    **Previous Answers**     **SCalcET8 5.3.053.**         🗅 **My Notes**      **Ask Your Teacher**
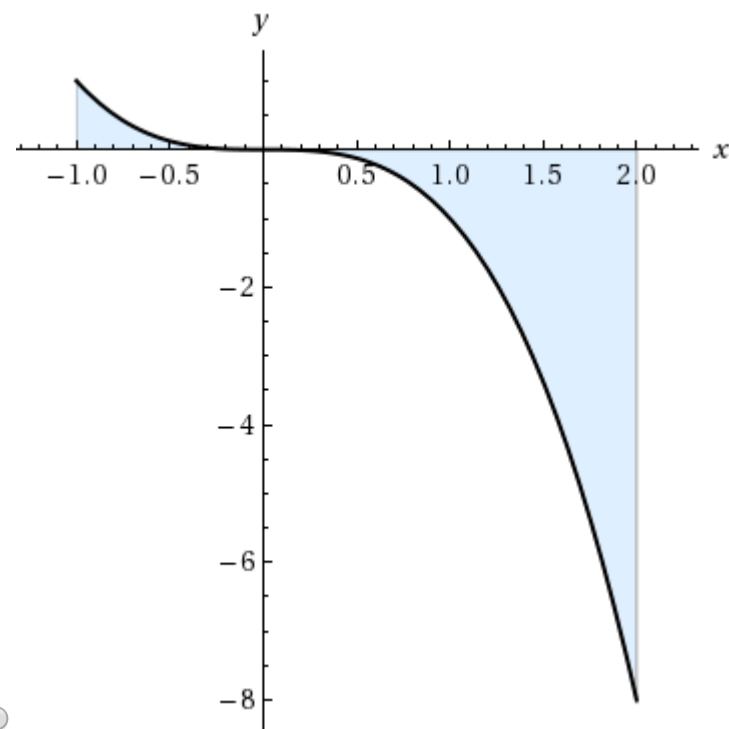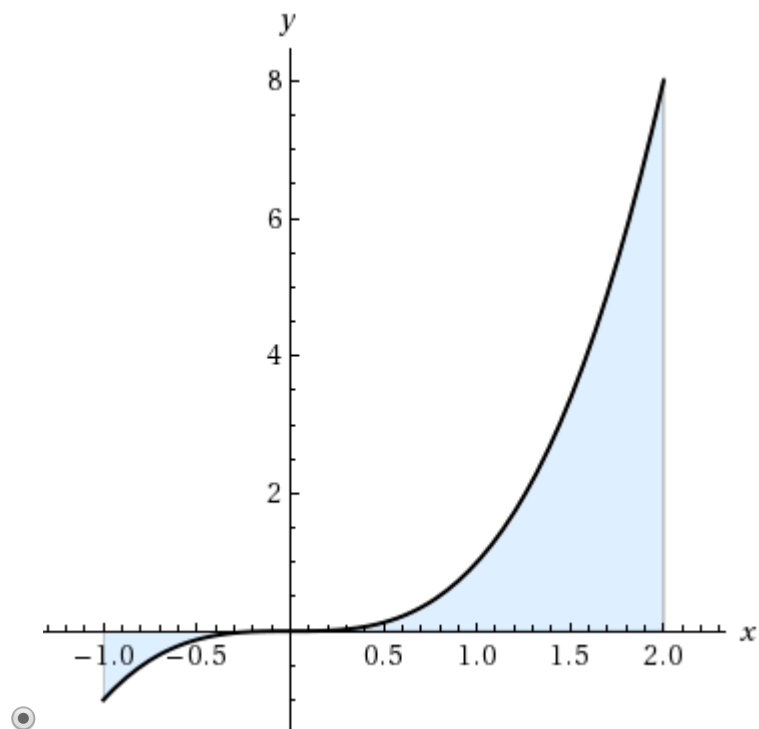
Evaluate the integral and interpret it as a difference of areas.

$$\int_{-1}^{2} x^3 \, dx$$

154

✔

Illustrate with a sketch.

**Need Help?** [ Talk to a Tutor ]

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**5.**     **2/0 points**   **Previous Answers**     **SCalcET8 5.3.082.**          ⟋ **My Notes**     **Ask Your Teacher**

Let

$$f(x) = \begin{cases} 0 & \text{if } x < 0 \\ x & \text{if } 0 \le x \le 1 \\ 2 - x & \text{if } 1 < x \le 2 \\ 0 & \text{if } x > 2 \end{cases}$$
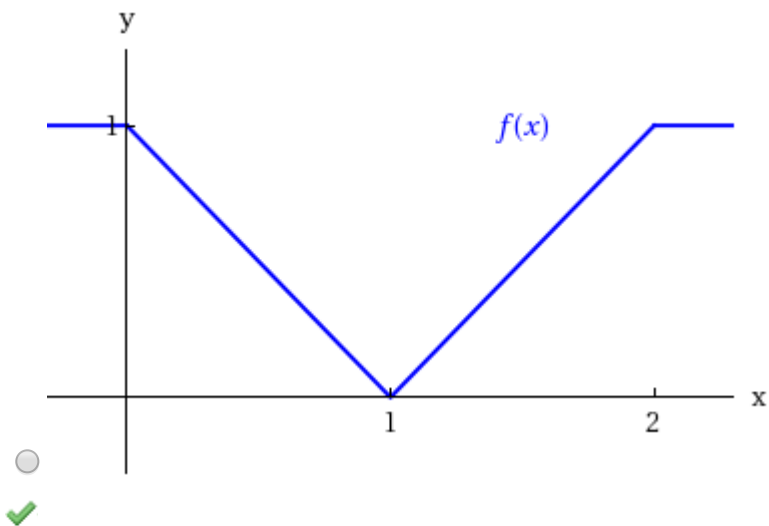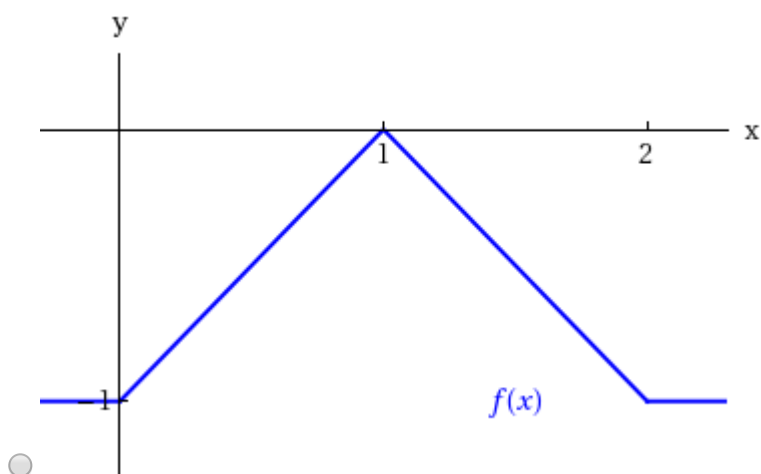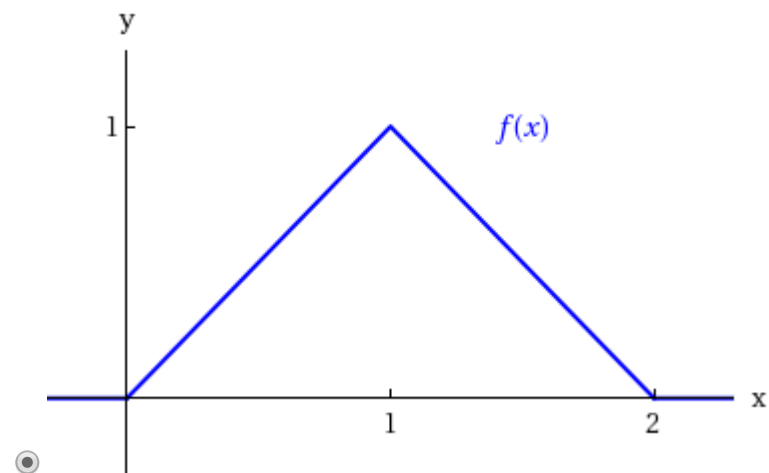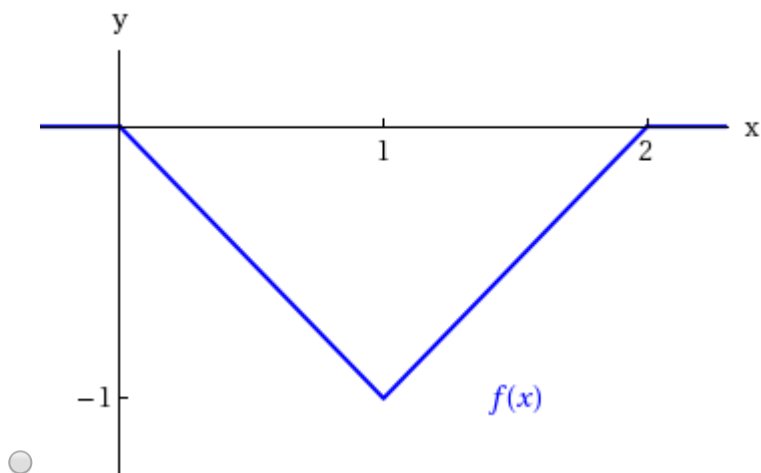
and

$$g(x) = \int_0^x f(t)\, dt.$$

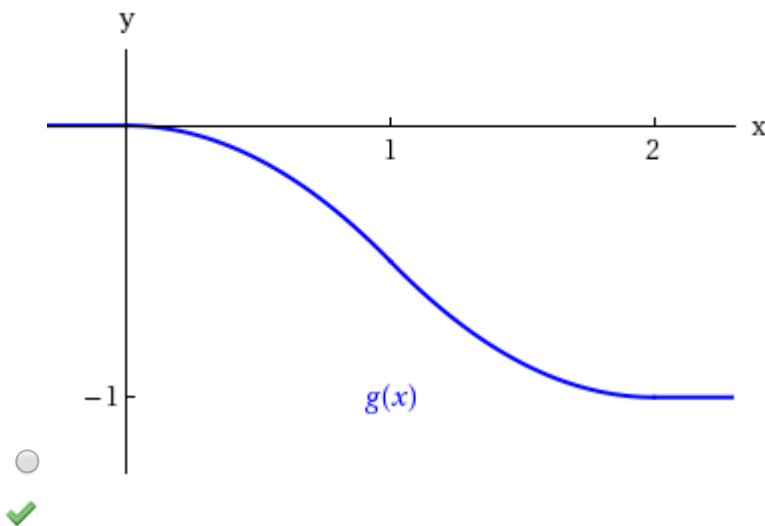(a) Find an expression for $g(x)$ similar to the one for $f(x)$.

$g(x) = \begin{cases} \\ \\ \\ \\ \end{cases}$

| | |
|---|---|
| ⟍0 | if $x < 0$ ✔ |
| ⟍x22 | if $0 \le x \le 1$ ✔ |
| ⟍2x−x22−1 | if $1 < x \le 2$ ✔ |
| ⟍1 | if $x > 2$ ✔ |

(b) Sketch the graph of $f$.

Sketch the graph of *g*.
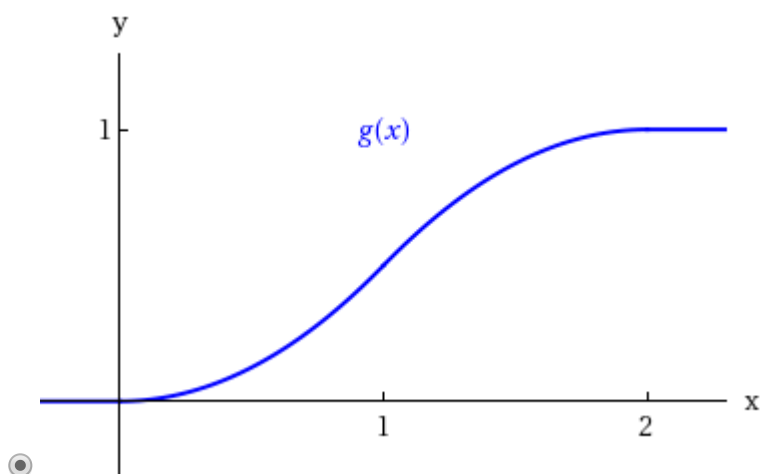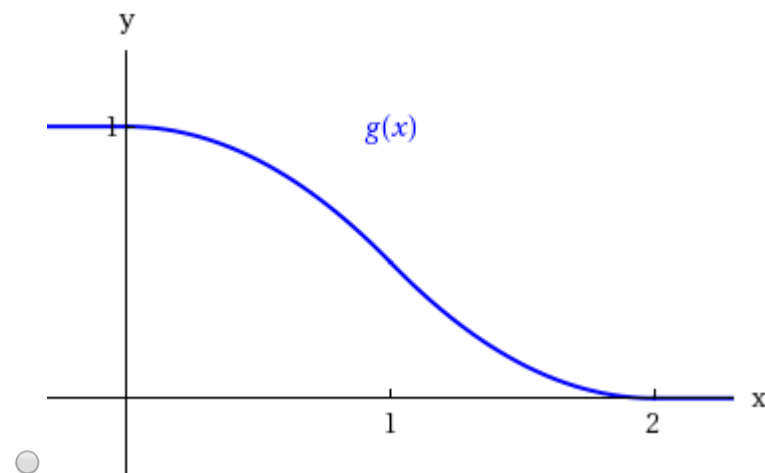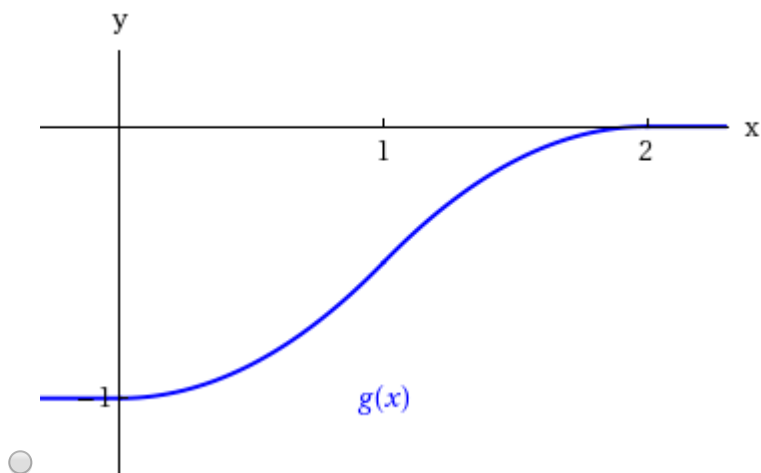
(c) Where is *f* differentiable? (Enter your answer using interval notation.)

$(-\infty,0) \cup (0,1) \cup (1,2) \cup (2,\infty)$

✔

Where is *g* differentiable? (Enter your answer using interval notation.)

$(-\infty, \infty)$

✔

6.       **2/0 points**   **Previous Answers**     SCalcET8 5.3.084.                        ⬒ **My Notes**      **Ask Your Teacher**
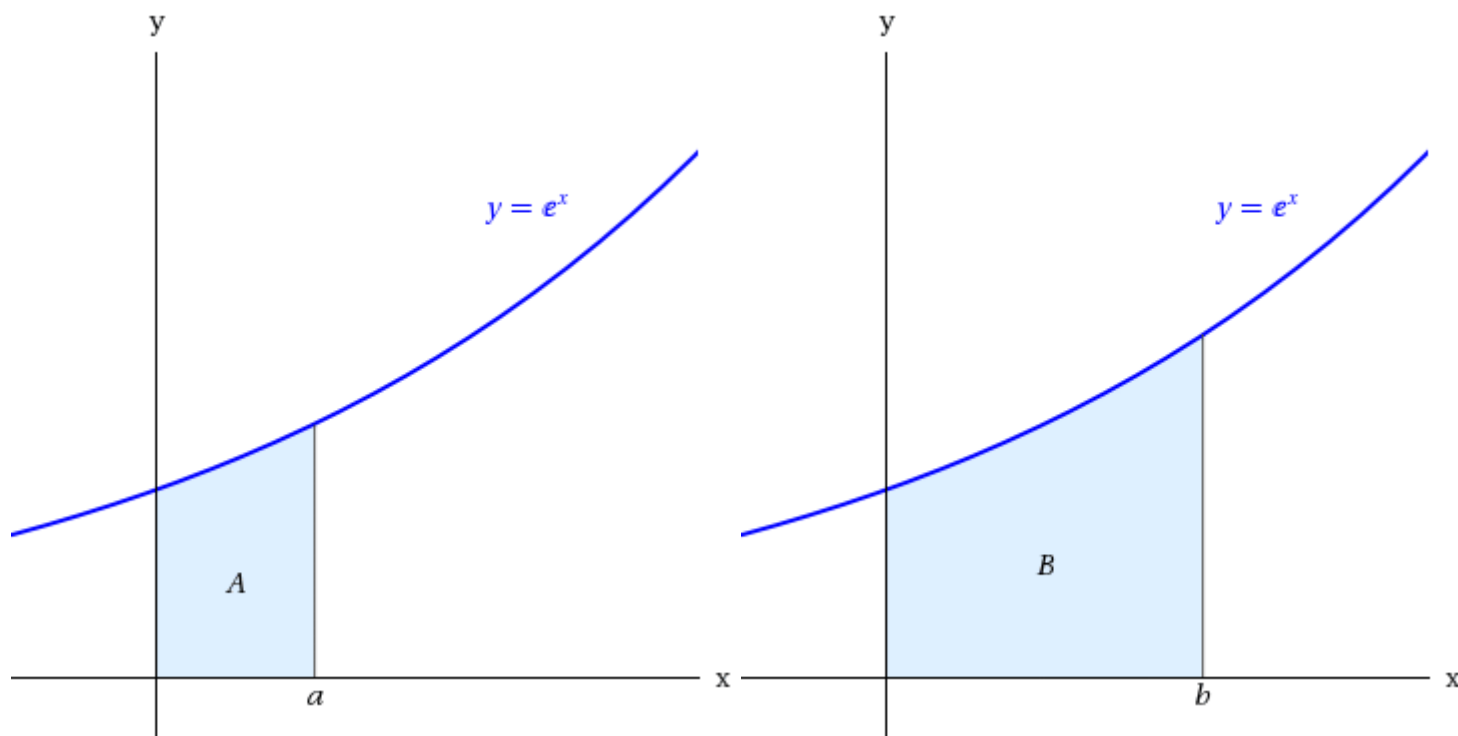
The area labeled *B* is three times the area labeled *A*. Express *b* in terms of *a*.

*b* =

⬚ *ln*(3*ea*−2)

✔

7.    **1/1 points**    **Previous Answers**    SCalcET8 5.4.049.                                                    ⬚ **My Notes**    **Ask Your Teacher**

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 $\displaystyle\int_0^8 (8y - y^2)\, dy$. (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.

256/3 ✔

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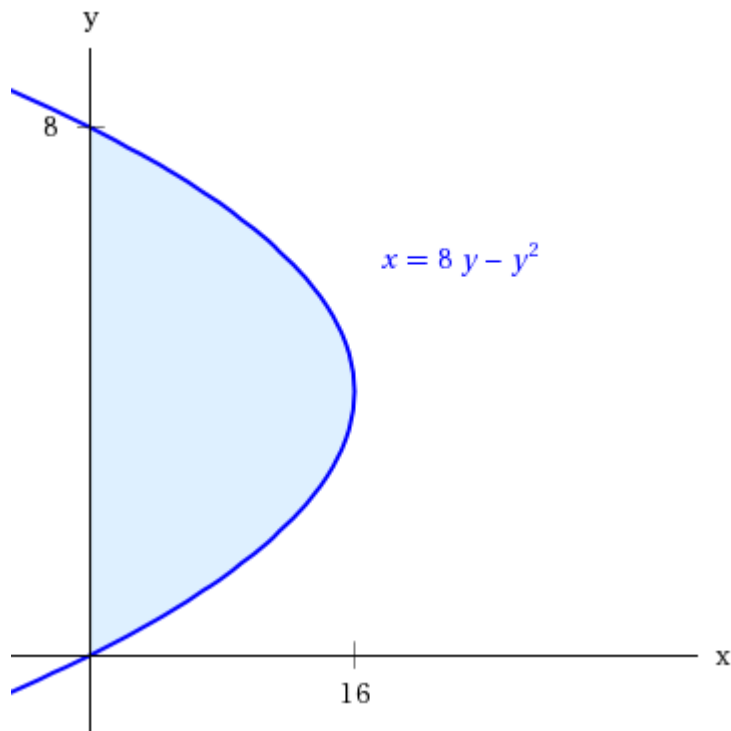
**8.** | **2/0 points** | **Previous Answers** | SCalcET8 5.4.059. | 📄 **My Notes** | **Ask Your Teacher**

The velocity function (in meters per second) is given for a particle moving along a line.

$$v(t) = 3t - 8, \quad 0 \leq t \leq 3$$

(a) Find the displacement.

-21/2 ✔ m

(b) Find the distance traveled by the particle during the given time interval.

65/6 ✔ m

**Need Help?** [Watch It] [Talk to a Tutor]

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**9.** | **2/2 points** | **Previous Answers** | SCalcET8 5.4.061. | 📄 **My Notes** | **Ask Your Teacher**

The acceleration function (in m/s$^2$) and the initial velocity are given for a particle moving along a line.

$$a(t) = t + 8, \quad v(0) = 6, \quad 0 \leq t \leq 10$$

(a) Find the velocity at time $t$.

$v(t) =$

$t22+8t+6$

✔ m/s

(b) Find the distance traveled during the given time interval.

1880/3 ✔ m

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**10.**     **1/1 points**   **Previous Answers**     **SCalcET8 5.4.063.**                        🗋 **My Notes**     **Ask Your Teacher**

The linear density of a rod of length 4 m is given by $\rho(x) = 8 + 4\sqrt{x}$ measured in kilograms per meter, where $x$ is measured in meters from one end of the rod. Find the total mass of the rod.

160/3 ✔ kg

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**11.**     **2/2 points**   **Previous Answers**     **SCalcET8 5.4.511.XP.**                     🗋 **My Notes**     **Ask Your Teacher**

The velocity function (in meters per second) is given for a particle moving along a line.

$$v(t) = t^2 - 2t - 15, \quad 1 \le t \le 7$$

(a) Find the displacement.

-24 ✔ m

(b) Find the distance traveled by the particle during the given time interval.

184/3 ✔ m

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12.        **4/3 points**    **Previous Answers**      SCalcET8 5.4.AE.006.                                     📝 **My Notes**        **Ask Your Teacher**

**Video Example** 🔊

**EXAMPLE 6**    A particle moves along a line so that its velocity at time $t$ is

$v(t) = t^2 - t - 20$  (measured in meters per second).

(a) Find the displacement of the particle during $3 \le t \le 10$.
(b) Find the distance traveled during this time period.

SOLUTION

(a) By this equation, the displacement is

$$s(10) - s(3) = \int_3^{10} v(t)\, dt$$

$$= \int_3^{10} (t^2 - t - 20)\, dt$$

$$= \left[ \rule{0pt}{40pt} \right.$$

$$= \boxed{\phantom{xxxxxxxxx}}\!t33$$

$$\boxed{\phantom{xxxxxxxxx}}$$

$$\checkmark \quad \left. -\frac{t^2}{2} - 20t \right]_3^{10}$$

$$= \boxed{\phantom{xxxxxxxxx}}\!8336$$

$$\boxed{\phantom{xxxxxxxxx}}$$

$$\checkmark \quad .$$

This means that the particle moved approximately 138.83 meters to the right.

(b) Note that $v(t) = t^2 - t - 20 = (t - 5)(t + 4)$ and so $v(t)$ ≤ ▼  ✔  0 on the

interval $[3, 5]$ and $v(t)$ [≥ ▼] ✔   0 on $[5, 10]$. Thus, from this equation, the distance traveled is

$$\int_3^{10} |v(t)|\, dt = \int_3^5 [-v(t)]\, dt + \int_5^{10} v(t)\, dt$$

$$= \int_3^5 (-t^2 + t + 20)\, dt + \int_5^{10} (t^2 - t - 20)\, dt$$

$$= \checkmark \left[ \phantom{xxxxx} \phantom{xxxxx} \;{-t33+t22+20t} \right]_3^5 + \left[ \phantom{xxxxx} \phantom{xxxxx} \;{t33-t22-20t} \right]_5^{10} \checkmark$$

$$= \frac{\phantom{xxxxx}}{\phantom{xxxxx}}\;{3392} \checkmark .$$

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