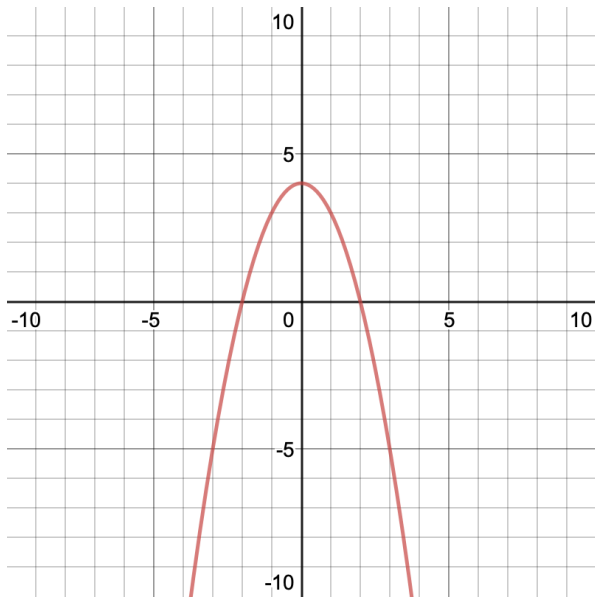


**East Los Angeles College**  
**Department of Mathematics**  
**Math 261**  
**Test 4 and Final Exam Study Guide**

Your final exam will not be as long as this study guide. However, this will serve as a good tool to describe the topics to review for your final exam.

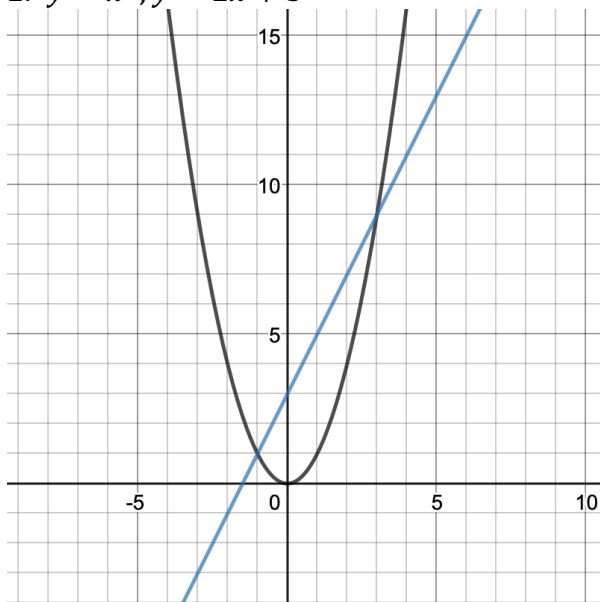
Determine the area under the curve over the following intervals.

1.  $f(x) = 4 - x^2$  over  $[0, 2]$



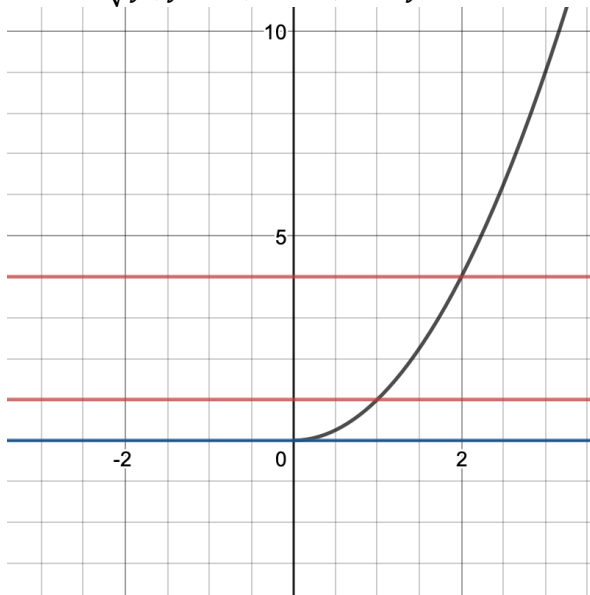
Determine the area of the bounded region.

2.  $y = x^2, y = 2x + 3$



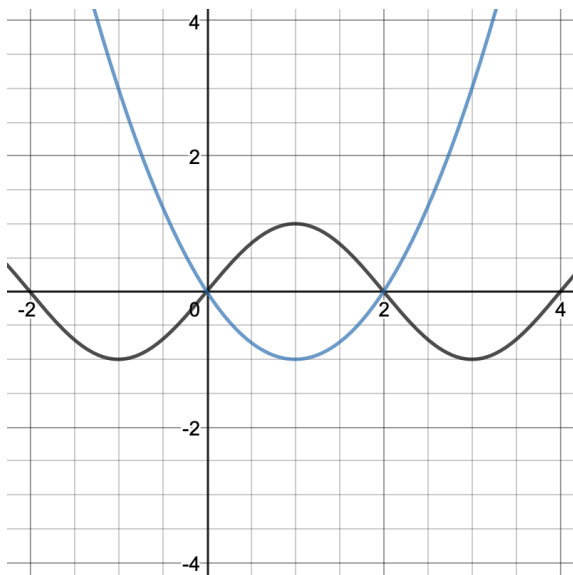
Determine the area of region over the given interval.

3.  $x = \sqrt{y}, y = 0, x = 0, 1 \leq y \leq 4$



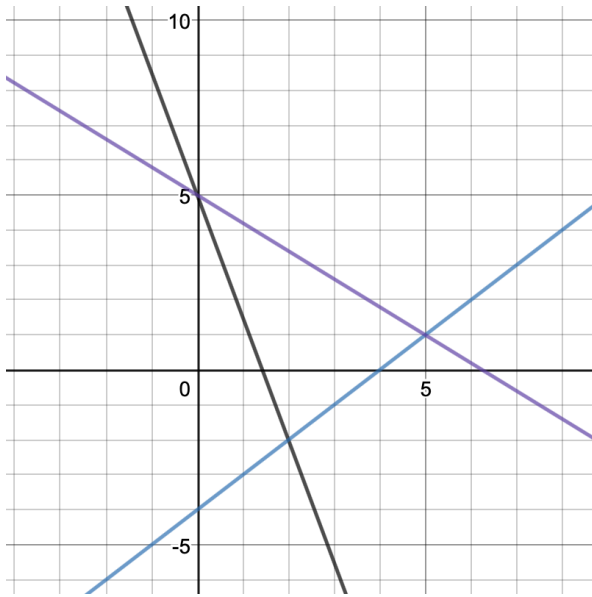
Determine the area between curves

4.  $y = \sin\left(\frac{\pi x}{2}\right)$  and  $y = x^2 - 2x$



5. Use Calculus to find the area of the triangle with the given vertices. (0,5) and (2,-2) and (5,1) whose lines are represented by the following equations.

$$y = -\frac{7}{2}x + 5 \text{ and } y = x - 4 \text{ and } y = -\frac{4}{5}x + 5$$



Integrate the following.

6.  $\int_0^4 (x + 2|x - 1| + 3) dx$

7.  $\int_0^{\pi} (2 \sin(x) - \cos(2x) + \sec^2(\pi x)) dx$

8.  $\int_0^{\pi} \sin^2(x) \cos(x) dx$

9.  $\int_0^2 4x^2 \sqrt{1 + x^3} dx$

10.  $\int_0^2 \sqrt{1 + 4x} dx$

11.  $\int_1^3 \frac{1}{(2x+3)^3} dx$

12.  $\int \sec^2(\pi x) dx$

13.  $\int (x - 4x^{3/2} + 5) dx$

Solve the following differential equations.

14.  $f'(x) = \sqrt{x}(6 + 5x)$  where  $f(1) = 10$

16.  $f''(\theta) = \sin(\theta) + \cos(\theta)$  where  $f(0) = 3$  and  $f'(0) = 4$

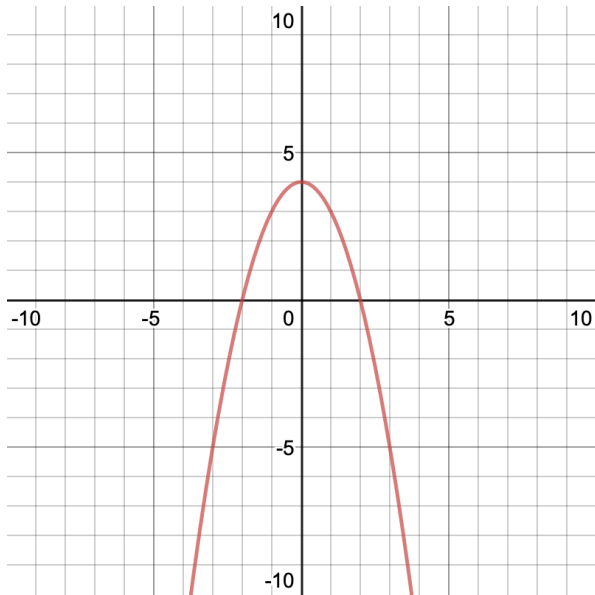
Use the midpoint rule with the given value of  $n$  to approximate the following integrals.

16.  $\int_0^2 \cos(x^3) dx$  with  $n = 5$

17.  $\int_1^2 e^{-x^2} dx$  where  $n = 10$

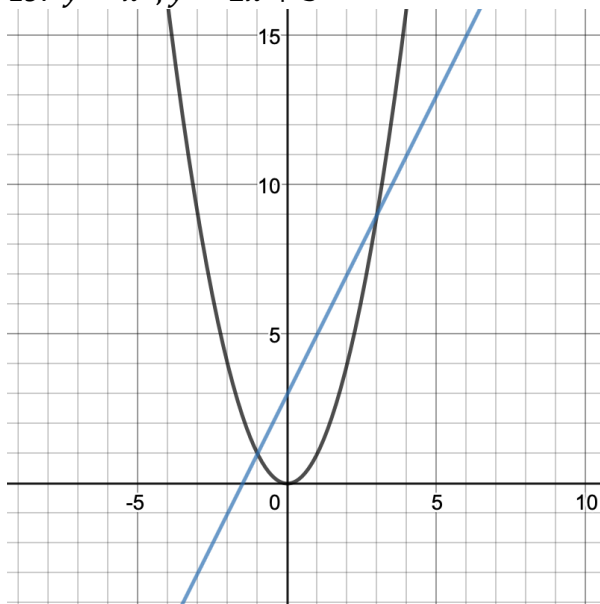
Determine the volume of revolution about the x-axis for the given function over the indicated interval.

18.  $f(x) = 4 - x^2$  over  $[0,2]$

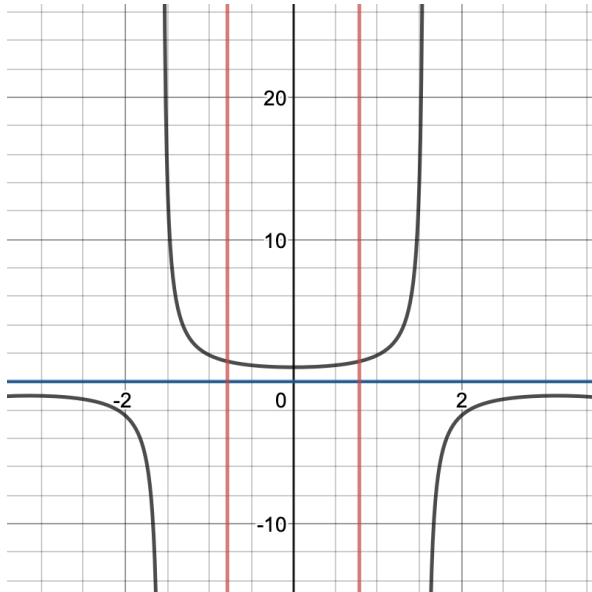


Determine the volume of the solid when revolving the bounded region about the x-axis.

19.  $y = x^2, y = 2x + 3$

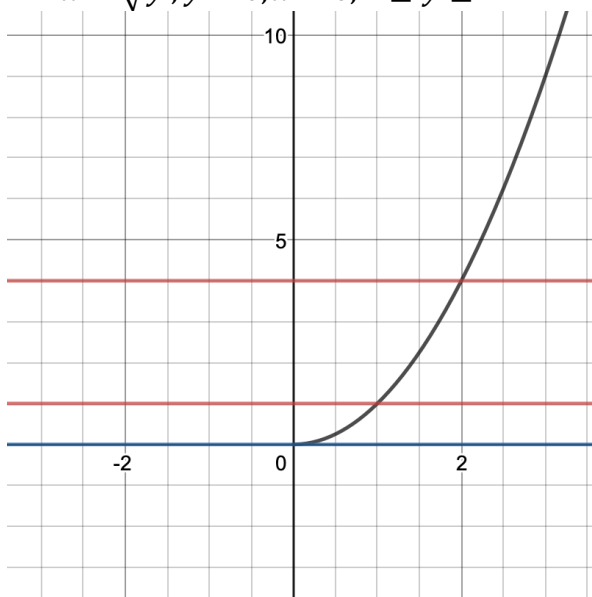


20.  $y = \sec(x), y = 0, x = -\frac{\pi}{4}, x = \frac{\pi}{4}$

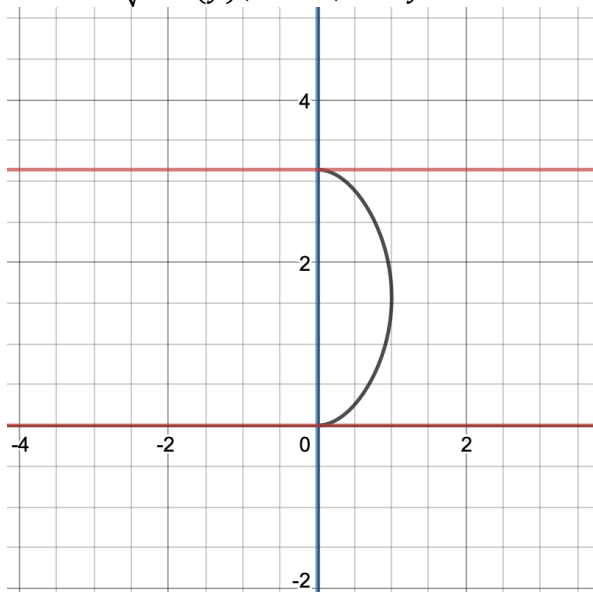


Determine the volume of the solid by rotating the region enclosed by the graphs about the y-axis over the given interval.

21.  $x = \sqrt{y}, y = 0, x = 0, 1 \leq y \leq 4$

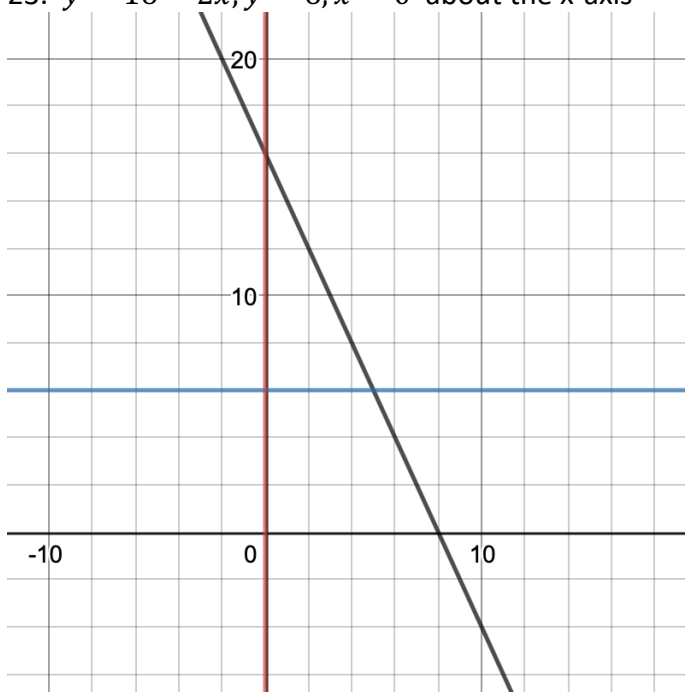


22.  $x = \sqrt{\sin(y)}, x = 0, 0 \leq y \leq \pi$

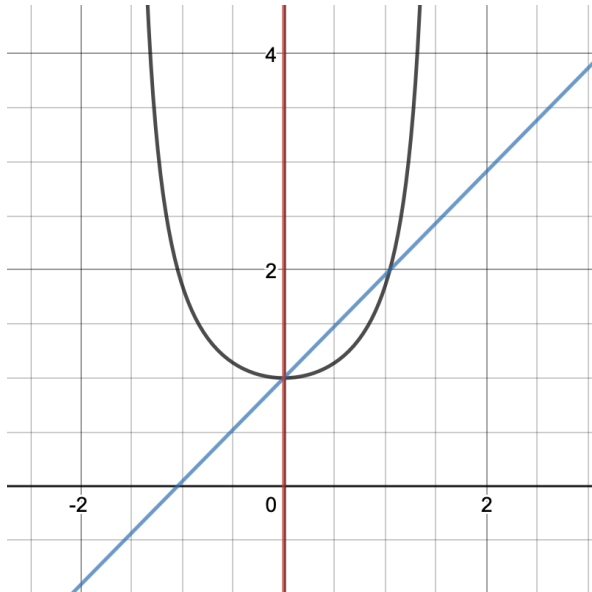


Find the volume of the solid obtained by rotating the region enclosed by the graphs about the given axis.

23.  $y = 16 - 2x, y = 6, x = 0$  about the x-axis



24.  $y = \sec(x)$ ,  $y = 1 + \frac{3}{\pi}x$  about the x-axis



25.  $y = x^3$ ,  $y = \sqrt[3]{x}$  for  $x \geq 0$  about the y-axis

