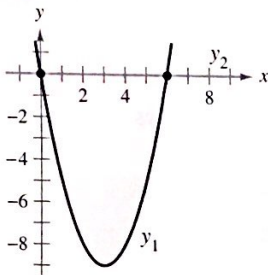


# 7.1 Exercises

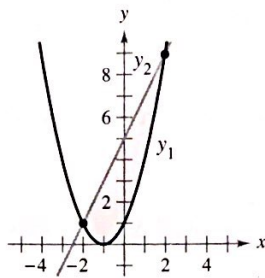
See CalcChat.com for tutorial help and worked-out solutions to odd-numbered exercises.

**Writing a Definite Integral** In Exercises 1–6, set up the definite integral that gives the area of the region.

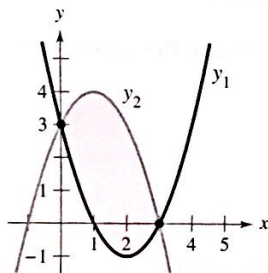
1.  $y_1 = x^2 - 6x$   
 $y_2 = 0$



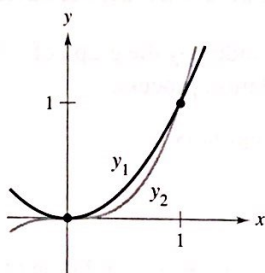
2.  $y_1 = x^2 + 2x + 1$   
 $y_2 = 2x + 5$



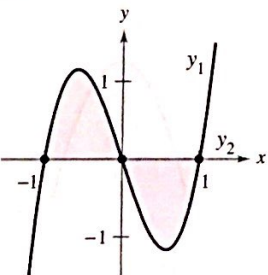
3.  $y_1 = x^2 - 4x + 3$   
 $y_2 = -x^2 + 2x + 3$



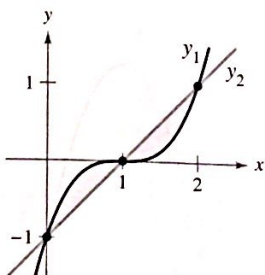
4.  $y_1 = x^2$   
 $y_2 = x^3$



5.  $y_1 = 3(x^3 - x)$   
 $y_2 = 0$



6.  $y_1 = (x - 1)^3$   
 $y_2 = x - 1$



**Finding a Region** In Exercises 7–12, the integrand of the definite integral is a difference of two functions. Sketch the graph of each function and shade the region whose area is represented by the integral.

7.  $\int_0^4 \left[ (x + 1) - \frac{x}{2} \right] dx$

8.  $\int_{-1}^1 [(2 - x^2) - x^2] dx$

9.  $\int_2^3 \left[ \left( \frac{x^3}{3} - x \right) - \frac{x}{3} \right] dx$

10.  $\int_{-\pi/4}^{\pi/4} (\sec^2 x - \cos x) dx$

11.  $\int_{-2}^1 [(2 - y) - y^2] dy$

12.  $\int_0^4 (2\sqrt{y} - y) dy$

**Think About It** In Exercises 13 and 14, determine which value best approximates the area of the region bounded by the graphs of  $f$  and  $g$ . (Make your selection on the basis of a sketch of the region and not by performing any calculations.)

13.  $f(x) = x + 1$ ,  $g(x) = (x - 1)^2$

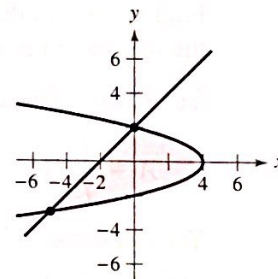
- (a) -2 (b) 2 (c) 10 (d) 4 (e) 8

14.  $f(x) = 2 - \frac{1}{2}x$ ,  $g(x) = 2 - \sqrt{x}$

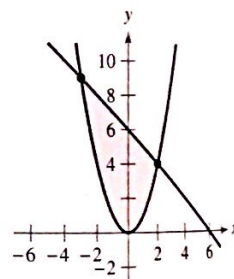
- (a) 1 (b) 6 (c) -3 (d) 3 (e) 4

**Comparing Methods** In Exercises 15 and 16, find the area of the region by integrating (a) with respect to  $x$  and (b) with respect to  $y$ . (c) Compare your results. Which method is simpler? In general, will this method always be simpler than the other one? Why or why not?

15.  $x = 4 - y^2$   
 $x = y - 2$



16.  $y = x^2$   
 $y = 6 - x$



**Finding the Area of a Region** In Exercises 17–30, sketch the region bounded by the graphs of the equations and find the area of the region.

17.  $y = x^2 - 1$ ,  $y = -x + 2$ ,  $x = 0$ ,  $x = 1$

18.  $y = -x^3 + 2$ ,  $y = x - 3$ ,  $x = -1$ ,  $x = 1$

19.  $f(x) = x^2 + 2x$ ,  $g(x) = x + 2$

20.  $y = -x^2 + 3x + 1$ ,  $y = -x + 1$

21.  $y = x$ ,  $y = 2 - x$ ,  $y = 0$

22.  $y = \frac{4}{x^3}$ ,  $y = 0$ ,  $x = 1$ ,  $x = 4$

23.  $f(x) = \sqrt{x} + 3$ ,  $g(x) = \frac{1}{2}x + 3$

24.  $f(x) = \sqrt[3]{x - 1}$ ,  $g(x) = x - 1$

25.  $f(y) = y^2$ ,  $g(y) = y + 2$

26.  $f(y) = y(2 - y)$ ,  $g(y) = -y$

27.  $f(y) = y^2 + 1$ ,  $g(y) = 0$ ,  $y = -1$ ,  $y = 2$

28.  $f(y) = \frac{y}{\sqrt{16 - y^2}}$ ,  $g(y) = 0$ ,  $y = 3$

29.  $f(x) = \frac{10}{x}$ ,  $x = 0$ ,  $y = 2$ ,  $y = 10$

30.  $g(x) = \frac{4}{2 - x}$ ,  $y = 4$ ,  $x = 0$