

## Area between Two Curves

To calculate the area between two continuous curves, we have the following theorem.

*Area between Two Curves Theorem:* Let  $f$  and  $g$  be continuous functions such that  $f(x) \geq g(x)$  on the interval  $[a, b]$ . Then, the area of the region bounded above by  $f(x)$  and below by  $g(x)$  on  $[a, b]$  is given by

$$\int_a^b [f(x) - g(x)] dx.$$

### Practice Problems in *Calculus: Concepts and Contexts* by James Stewart

1st ed. problem set:    Section 6.1 #1, #2, #5, #6, #7, #9, #10, #15, #16  
 2nd ed. problem set:    Section 6.1 #1, #2, #5–11 all, #16  
 3rd ed. problem set:    Section 6.1 #1, #2, #5–10 all, #16

### Practice Problems in *Calculus: Early Transcendentals* by Briggs and Cochran

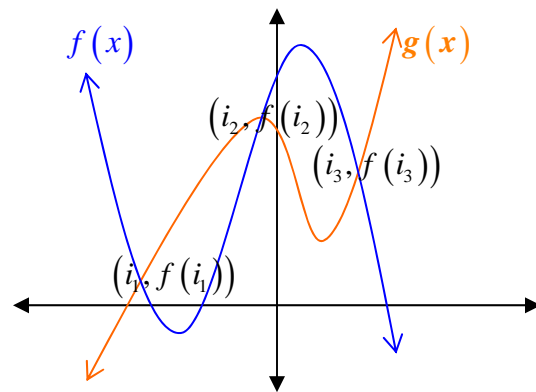
1st ed. problem set:    Section 6.2 #1-17 odd, #41, #43

### Possible Exam Problems

#1 Calculate the area bounded by  $y_1 = 2x - 1$  and  $y_2 = x^2 - 4$

Answer:  $\int_{-1}^3 (-x^2 + 2x + 3) dx = \frac{32}{3} \text{ sq. units}$

#2 Given that  $f$  and  $g$  intersect at  $x = i_1$ ,  $x = i_2$ , and  $x = i_3$ , construct an integral that gives the area bounded by  $f$  and  $g$  below.



Answer:  $\int_{i_1}^{i_2} [g(x) - f(x)] dx + \int_{i_2}^{i_3} [f(x) - g(x)] dx$