

Name

14-2 Lesson Master

Questions on SPUR Objectives  
See Student Edition pages 862–865 for objectives.

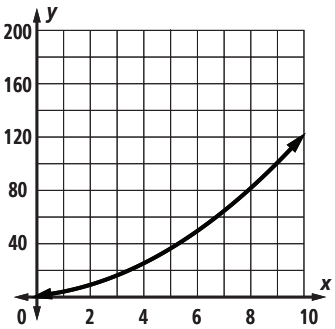
SKILLS Objective A

1. Consider the function  $f$  with equation  $f(x) = x^2 + 2x + 2$ . A graph of this function over the interval  $0 \leq x \leq 10$  is shown at the right.
- a. Find the Reimann sum of  $f$  over the interval from 0 to 10, partitioning the interval into 10 subintervals and using the right endpoints of the subintervals as the intermediate values.

b. Repeat Part a, using the left endpoints of the subintervals as the intermediate values.

c. Repeat Part c, using the midpoints of the subintervals as the intermediate values.

d. Which of the three Reimann sums you calculated in Parts a–c do you think gives the best estimate of the area under the curve from 0 to 10? Explain your answer. (It may help to sketch the rectangles in each case.)



2. Consider the function  $g$  where  $g(x) = \sin(x) + x$  over the interval  $[0, 25]$ , with  $x$  in radians.
- a. Let  $z_i$  be the right endpoint of the  $i$ th subinterval.

Calculate  $\sum_{i=1}^n g(z_i) \Delta x$  for  $n = 5$ ,  $n = 10$ , and  $n = 25$ .

b. Which of the values of  $n$  you used in Part a gives the best estimate of the area between the curve and the  $x$ -axis over  $[0, 25]$ ? Explain your answer.

USES Objective E

3. As a roller coaster starts down its last hill, its velocity increases. When it reaches the bottom of the hill, the velocity gradually decreases until it comes to a stop. The velocity of the roller coaster (in the direction of travel) in feet per second during the 30 seconds it takes to make the last drop and come to a stop is given by  $v(x) = -0.3x^2 + 8.64x + 10$ , where  $x$  is the number of seconds since leaving the top of the last hill.
- a. Fill in the table above by calculating the Riemann sums of the function  $v$  over the interval  $[0, 30]$  for the given values of  $n$ . Let  $z_i$  be the right endpoint of each subinterval.

b. To the nearest foot, what is the total distance traveled along the track by the rollercoaster on the last 30 seconds of each ride?

$n$	$\sum_{i=1}^n v(z_i) \Delta x$
10	
100	
1000	
10,000	