

# Classroom Voting Questions: Calculus II

## Section 5.1: How Do We Measure Distance Traveled?

1. **True or False** The left-sum always underestimates the area under the curve.
2. **True or False** Averaging the left- and right-sums always improves your estimate.
3. **True or False** Small rectangles will always result in a better estimation.
4. Consider the graph in Figure 5.1. On which interval is the left-sum approximation of the area under the curve on that interval an overestimate?

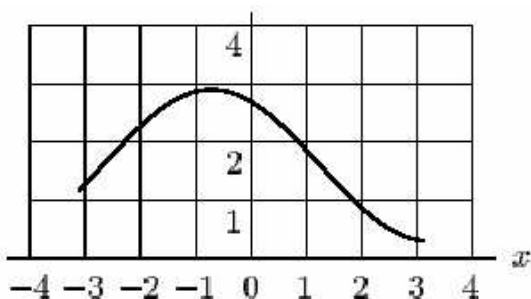


Figure 5.1

- (a)  $[-3, -1]$
  - (b)  $[-2, 0]$
  - (c)  $[0, 3]$
5. The velocities of two cars are given in Figure 5.2. Assuming that the cars start at the same place, when does Car 2 overtake Car 1?

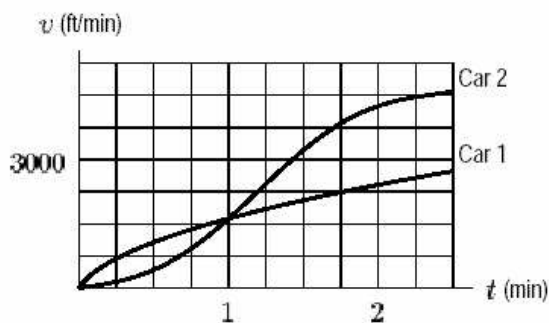


Figure 5.2

- (a) Between 0.75 and 1.25 minutes  
 (b) Between 1.25 and 1.75 minutes  
 (c) Between 1.75 and 2.25 minutes
6. You are taking a long road trip, and you look down to check your speed every 15 minutes. At 2:00 you are going 60 mph, at 2:15 you are going up a hill at 45 mph, at 2:30 you are going 65 mph, at 2:45 you are going through a canyon at 50 mph, and at 3:00 you are going 70 mph. Assume that in each 15-minute interval you are either always speeding up or always slowing down.
- Using left-hand sums, how far would you estimate that you went between 2:00 and 3:00?
- (a)  $(1/4)60 + (1/4)45 + (1/4)65 + (1/4)50 + (1/4)70$   
 (b)  $(1/4)60 + (1/4)45 + (1/4)65 + (1/4)50$   
 (c)  $(1/4)45 + (1/4)65 + (1/4)50 + (1/4)70$   
 (d)  $(1/4)60 + (1/4)65 + (1/4)65 + (1/4)70$   
 (e)  $(1/5)60 + (1/5)45 + (1/5)65 + (1/5)50 + (1/5)70$
7. You are taking a long road trip, and you look down to check your speed every 15 minutes. At 2:00 you are going 60 mph, at 2:15 you are going up a hill at 45 mph, at 2:30 you are going 65 mph, at 2:45 you are going through a canyon at 50 mph, and at 3:00 you are going 70 mph. Assume that in each 15-minute interval you are either always speeding up or always slowing down.
- Using right-hand sums, how far would you estimate that you went between 2:00 and 3:00?
- (a)  $(1/4)60 + (1/4)45 + (1/4)65 + (1/4)50 + (1/4)70$   
 (b)  $(1/4)60 + (1/4)45 + (1/4)65 + (1/4)50$   
 (c)  $(1/4)45 + (1/4)65 + (1/4)50 + (1/4)70$   
 (d)  $(1/4)60 + (1/4)65 + (1/4)65 + (1/4)70$
8. You are taking a long road trip, and you look down to check your speed every 15 minutes. At 2:00 you are going 60 mph, at 2:15 you are going up a hill at 45 mph, at 2:30 you are going 65 mph, at 2:45 you are going through a canyon at 50 mph, and at 3:00 you are going 70 mph. Assume that in each 15-minute interval you are either always speeding up or always slowing down.
- What would be your estimate of the maximum possible distance that you could have traveled between 2:00 and 3:00?
- (a)  $(1/4)60 + (1/4)45 + (1/4)65 + (1/4)50 + (1/4)70$

- (b)  $\frac{1}{4}60 + \frac{1}{4}45 + \frac{1}{4}65 + \frac{1}{4}50$
- (c)  $\frac{1}{4}45 + \frac{1}{4}65 + \frac{1}{4}50 + \frac{1}{4}70$
- (d)  $\frac{1}{4}60 + \frac{1}{4}65 + \frac{1}{4}65 + \frac{1}{4}70$

9. The table below gives a cars velocity,  $v$ , in miles per hour, with time,  $t$ , in minutes. In each of the four fifteen-minute intervals, the car is either always speeding up or always slowing down. The cars route is a straight line with four towns on it. Town  $A$  is 60 miles from the starting point, town  $B$  is 70 miles from the starting point, town  $C$  is 73 miles from the starting point, and town  $D$  is 80 miles from the starting point.

$t$ (minutes)	0	15	30	45	60
$v$ (miles per hour)	60	75	72	78	65

We know the car is

- (a) between towns A and B.
- (b) between towns B and C.
- (c) between towns C and D.
- (d) between towns A and D, but cant define more clearly.
- (e) past town D.
- (f) None of the above.