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.

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

2. **True or False** Averaging the left and right sums always improves your estimate.

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

3. **True or False** When estimating an integral with right or left sums, smaller rectangles will always result in a better estimation.

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

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?

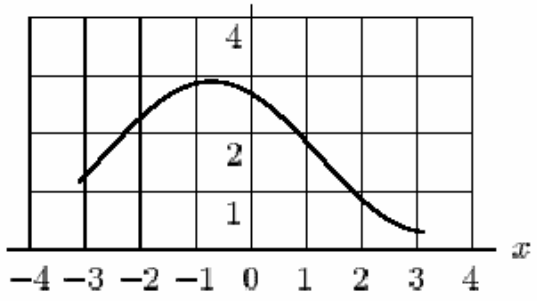

Figure 5.1

(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?

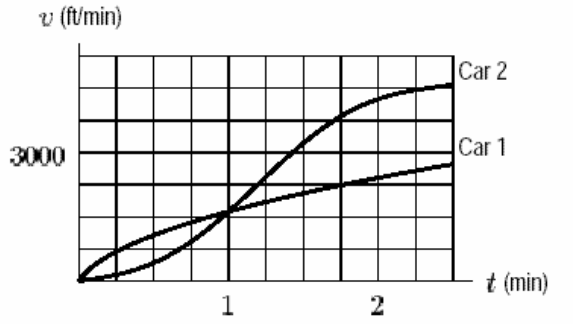

Figure 5.2

(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) $(1/15)60 + (1/15)45 + (1/15)65 + (1/15)50 + (1/15)70$

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) $(1/4)60 + (1/4)45 + (1/4)65 + (1/4)50$

   (c) $(1/4)45 + (1/4)65 + (1/4)50 + (1/4)70$

   (d) $(1/4)60 + (1/4)65 + (1/4)65 + (1/4)70$

9. The table below gives a car's 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 car's 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 can't define more clearly.

   (e) past town D.

   (f) None of the above.