

A car is traveling so that its speed is never decreasing during a 10-second interval. The speed at various moments in time is listed in the table below.

Time in seconds	0	2	4	6	8	10
Speed in ft/sec	30	36	40	48	54	60

- (a) Use the table to help explain why the best lower estimate for the distance traveled in the first 2 seconds is 60 feet.
- (b) Use the table to help explain why the best upper estimate for the distance traveled in the first 2 seconds is 72 feet.
- (c) Use the table to give the best lower estimate for the distance traveled in the first 10 seconds. An answer of 300 feet (which ignores some data in the table) is not correct.
- (d) Use the table to give the best upper estimate for the distance traveled in the first 10 seconds. These sums of products that you have found in (c) and (d) are called Riemann sums.
- (e) If you choose the lower estimate for your approximation of how far the car travels, what is the maximum amount your approximation could differ from the exact distance?
- (f) Choose speeds to correspond with $t = 1, 3, 5, 7, 9$. Keep the nondecreasing nature of the above table and do not select the average of the consecutive speeds. Find new best upper and lower estimates for the distance traveled for these 10 seconds.
- (g) Predict the difference between the low and high estimates if the speed is measured every 0.25 seconds.