

The class is going on a field trip, but the odometer on the school bus (which tracks distance) is broken. The speedometer works, so you begin keeping track of velocity data on the trip:

Time (min)	Velocity (mph)
0	5
10	30
30	42
60	55

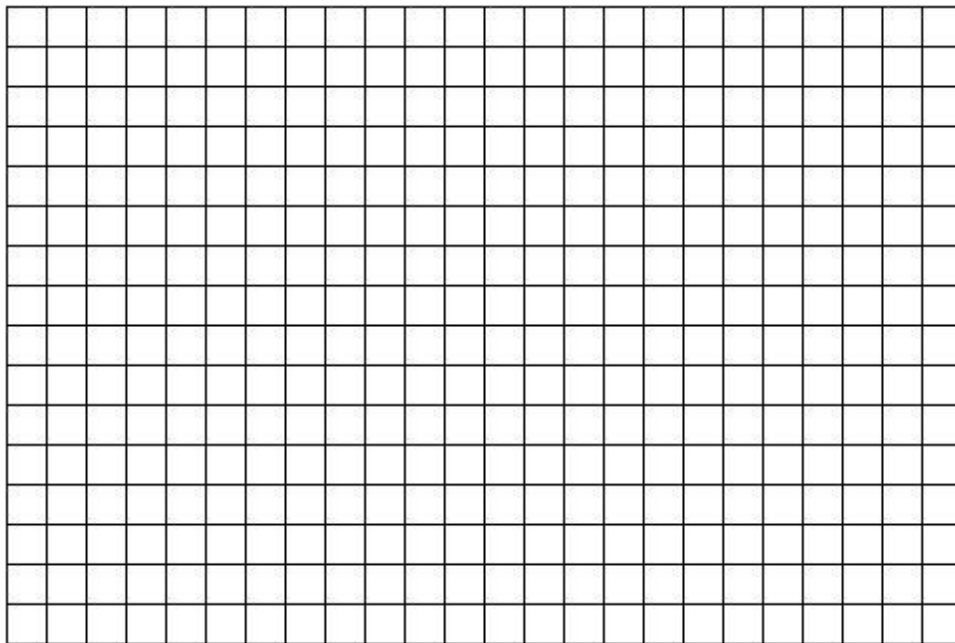
1. So over the first 10 minutes, the bus speeds up from 5 to 30 mph. First, we should deal with units, since we have minutes and miles per hour. How many hours is 10 minutes?
2. Explain why in the first 10 minutes the bus travels between 0.833 and 5 miles.
3. Now let's consider the time from 10 to 30 minutes. How many hours is that?
4. Calculate an underestimate and an overestimate for the distance traveled between 10 and 30 minutes.

5. Continue with the remaining time intervals. Then add your over- and under- estimates.

Over the hour, the bus travels between _____ and _____ miles.

6. What is your best guess of total distance traveled?

7. Let's make this visual. Plot the velocity data as points on the grid provided. Then represent your calculations on the graph, using different colors for underestimates and overestimates.



8. What would you need in order to get a more accurate estimate of distance traveled?

9. What does the graph tell us about the connection between velocity $v(t)$ and distance traveled $s(t)$?

10. What did we already know about the relationship between $v(t)$ and $s(t)$? (Think Calc I.)
11. Leave this blank for the very important conclusion.
12. Suppose that $v(t) = 5 + 50t^2$, where t is time in hours. How far does the bus travel in 1 hour **exactly**?