Section 2.1 worksheet

1. You took a little trip in your car. Here are the tripmeter readings (in miles) at various times (in hours).

time	1	3	5
odometer	60.00	103.9	134.2

a. What was your average speed from time t = 1to time t = 3?

b. Does your answer to part (a) tell you how fast were you going at time t = 1?

2. Here's a little more tripmeter data from your trip.

time	1	2	3	4	5
odometer	60.00	84.85	103.9	120.0	134.2

a. What was your average speed from time t = 1to time t = 2?

b. Does your answer to part (a) tell you how fast were you going at time t = 1?
What would you need to get a better estimate of your speed at time t = 1?

3. A little more data.

time	1	1.5	2.	2.5	3.
odometer	60.00	73.48	84.85	94.87	103.9

a. What was your average speed from time t = 1to time t = 1.5?

b. Does your answer to part (a) tell you how fast were you going at time t = 1?
What would you need to get a better estimate of your speed at time t = 1?

4. A little more data (last one)

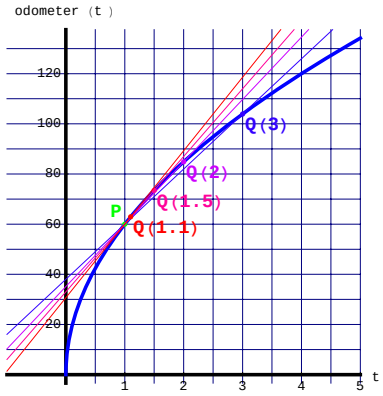
time	1	1.1	1.2	1.3	1.4	1.5
odometer	60.00	62.93	65.73	68.41	70.99	73.48

a. What was your average speed from time t = 1to time t = 1.1?

b. Does your answer to part (a) tell you how fast were you going at time t = 1?
What would you need to get a better estimate of your speed at time t = 1?

Here is a graph of the showing the odometer reading at time t.

The point P is the point on the graph with t coordinate t = 1.
The points $Q(t)$ are the points on the graph with coordinates (t, odometer(t)).



5. Slopes.

a. Compute the slope of line through P and the points $Q(3)$.

b. Compute the slope of line through P and the points $Q(2)$.

c. Compute the slope of line through P and the points $Q(1.5)$.

d. Compute the slope of line through P and the points $Q(1.1)$.

e. The number you got for (5a) should be the same number you got for (2a).
Use this fact to complete the following sentence: The slope of the line through P and $Q(3)$ is equal to....
Using similar observations to complete the following sentences.
The slope of the line through P and $Q(2)$ is equal to ...
The slope of the line through P and $Q(1.5)$ is equal to ...
The slope of the line through P and $Q(1.1)$ is equal to ...

f. Sketch the line tangent to the odometer function at the point P.
Estimate the slope of the tangent line.
Complete the sentence: The slope of the tangent line at the point P is equal to...