

Instantaneous Rates of Change

PART A

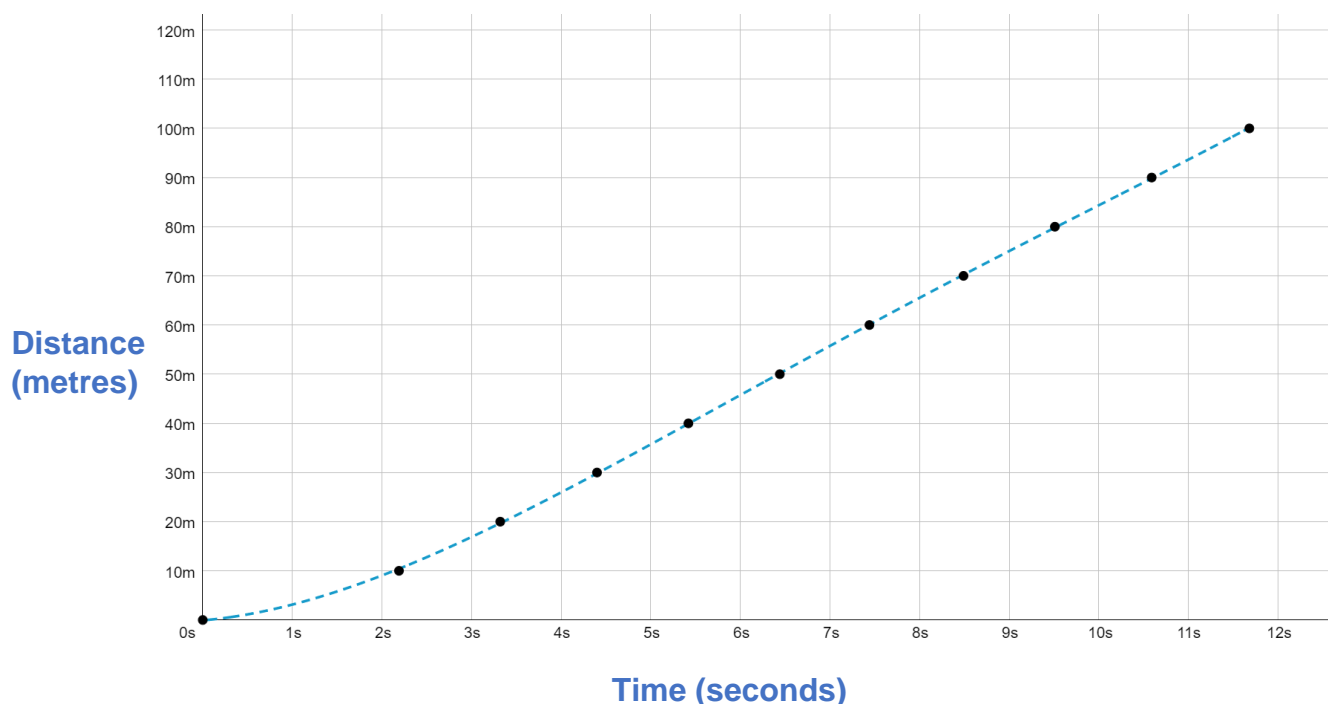
Watch the video of Rhasidat Adeleke's sprint run in the 100m and answer the following questions:

1. This was the fastest run of the race. But how fast was it? What was Rhasidat Adeleke's speed over the entire race?
2. Do you think she ran at the same speed over the course of the entire race? Why / Why not? Explain your reasoning.
3. Sketch what you think the graph of Rhasidat Adeleke's distance (y axis) versus time (x-axis) looks like. Briefly comment on why you sketched the graph you did.

PART B

The table and graph below show the distance-time information recorded during this race.

Time (s)	0	2.19	3.32	4.40	5.42	6.44	7.44	8.49	9.51	10.59	11.68
Distance (m)	0	10	20	30	40	50	60	70	80	90	100



Answer the following questions:

1. By referring to your graph - calculate Rhasidat Adeleke's average speed over the duration of the entire race.
2. By referring to your graph, make a supporting argument for your answer to Q2. from Part A above. Outline as much supporting evidence as you can.
3. Compare this graph to your predicted graph in Q3. from Part A above. Comment on any differences between your prediction and the actual graph.
4. At what point in the race do you think Rhasidat Adeleke's speed was highest? Explain your reasoning.

PART C

Download and [open the attached GeoGebra file called *Rhasidat Adeleke Data*](#). Use it to help answer the following questions.

1. Confirm Rhasidat Adekele's average speed over the course of the race by dragging points A and B to the appropriate points on the graph.
2. By moving points A and B, confirm that Rhasidat Adelek's speed was not constant over the course of the entire race. Explain your thinking.
3. By moving points A and B, investigate the time at which Rhasidat Adeleke was travelling fastest during the race. Make a prediction of when Rhasidat Adeleke was moving at top speed and what this speed was. Explain your approach to doing this.
4. By moving points A and B, get the best estimate of Rhasidat Adeleke's speed as she crosses the 10 m mark on the track. Explain your approach.