

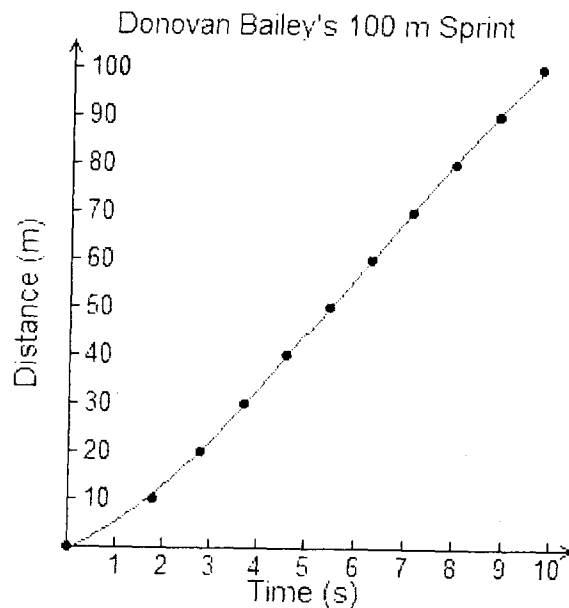
A Race to the Finish Line

During the 1997 World Championships in Athens, Greece, Maurice Greene and Donovan Bailey ran a 100 m race.

Part A

The graph and table below show Donovan Bailey's performance during this 100 m race.

Donovan Bailey's Performance	
Time (s)	Distance (m)
0	0
1.78	10
2.81	20
3.72	30
4.59	40
5.44	50
6.29	60
7.14	70
8.00	80
8.87	90
9.77	100



1. a) Calculate Donovan Bailey's average velocity for this 100 m sprint.

$$\text{Average Velocity} = \frac{\text{change in distance}}{\text{change in time}} = \frac{\Delta d}{\Delta t}$$

- b) Draw a line from (0,0) to (9.77,100) on the graph above.

A line passing through at least two different points on a curve is called a secant.

- c) Explain the relationship between your answer to a) and the slope of the secant.

2. a) Draw the secants from (0,0) to (5.44,50) and from (5.44,50) to (9.77,100).

- b) Calculate the average velocities represented by the two secants drawn in a).

i)

ii)

- c) Compare Bailey's performance during the first and the second half of the race.

3. Describe the relationship between average velocity and the slope of the corresponding secant.

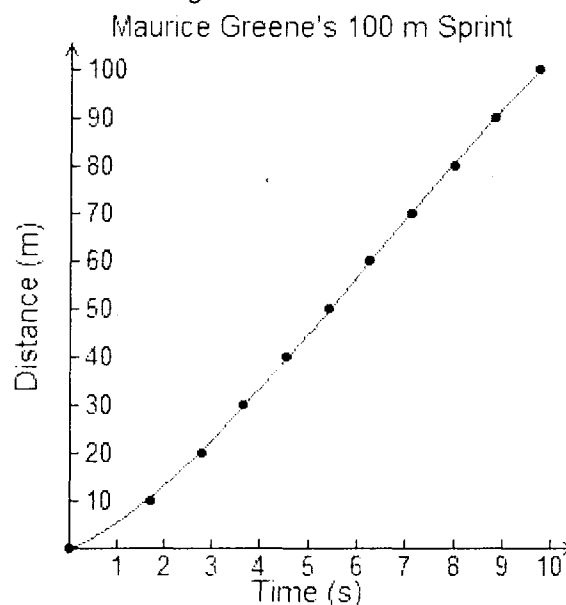
4. Calculate Bailey's average velocity for each 10 m interval of this 100 m race. Record your answers in the table below.

Interval (m)	Distance Travelled Δd (m)	Time Elapsed Δt (s)	Average Velocity (m/s)
0 to 10			
10 to 20			
20 to 30			
30 to 40			
40 to 50			
50 to 60			
60 to 70			
70 to 80			
80 to 90			
90 to 100			

Part B

The graph and table show Maurice Greene's performance during the same 100 m race.

Maurice Greene's Performance	
Time (s)	Distance (m)
0	0
1.71	10
2.75	20
3.67	30
4.55	40
5.42	50
6.27	60
7.12	70
7.98	80
8.85	90
9.73	100



Calculate Greene's average velocity for each 10 m interval of this 100 m race. Record your answers in the table below.

Interval (m)	Distance Travelled Δd (m)	Time Elapsed Δt (s)	Average Velocity (m/s)
0 to 10			
10 to 20			
20 to 30			
30 to 40			
40 to 50			
50 to 60			
60 to 70			
70 to 80			
80 to 90			
90 to 100			

Part C

Using your calculations from Parts A and B, describe this 100 m race run by Donovan Bailey and Maurice Greene. Include who was fastest and who was leading at various points during the race.