ICE - Derivative Short Cuts

Figure 1: Maurice "The Kansas Cannonball" Green

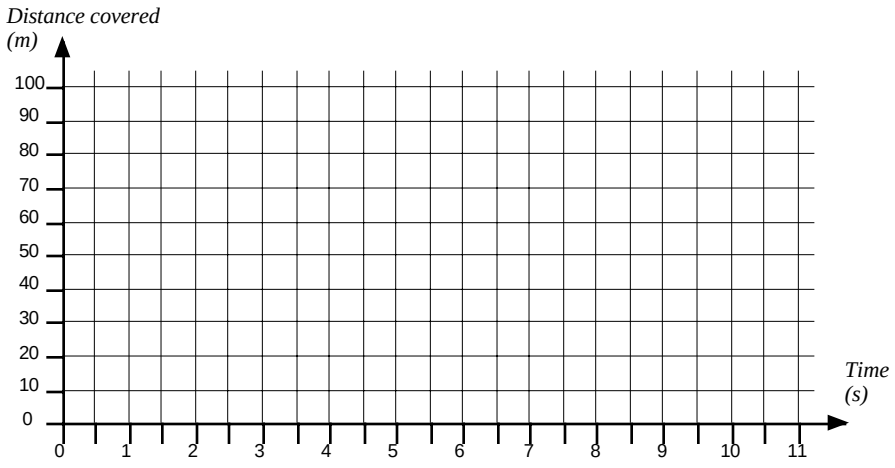
The fastest man in the world is currently Maurice "The Kansas Cannonball" Green (see Figure 1[1]). In 1999, Mr. Green broke the world record in the men's 100m, with a time of 9.79s. Table 1 shows some data for a race that Mr. Green won at the 1997 World Championships in Athens, Greece.

- ***In the context described in this problem, what quantity is represented by Mr Greens's rate of change? (Be specific.)***

Time (s)	0	1	2	3	4	5	6	7	8	9	9.86
Distance covered (m)	0	2.9825	10.098	19.913	31.368	43.283	55.35	67.141	78.6	89.951	100

Table 1: Amount of distance covered by Mr Green at various times during race.

- ***Use the data from Table 1 and the axes provided below to sketch a graph showing the amount of distance covered by Mr Green as a function of time.***



[1] Image Source: http://www.pulsecheck.com/

- ***Based on the appearance of your graph, what kind of function would do a good job of representing the trend in the data? Find an equation for this function.***

- ***Use the equation for your function to determine when Mr. Green reached the middle of the race (i.e. the time when he had covered 50 meters). How fast was Mr. Green running at this point in the race?***

- ***How fast was Mr. Green running when he crossed the finish line (i.e. at time 9.86 seconds)?***

- ***Use the equation that you have found to complete the entries in the table. Do the results approach a limiting value? If so, how would you interpret this limiting value in terms of distance, time, etc. ?***

Time interval t=9 to t=9.86	Rate of change over time interval
t=9.5 to t=9.86	
t=9.8 to t=9.86	
t=9.85 to t=9.86	
t=9.859 to t=9.86	
t=9.8599 to t=9.86	