

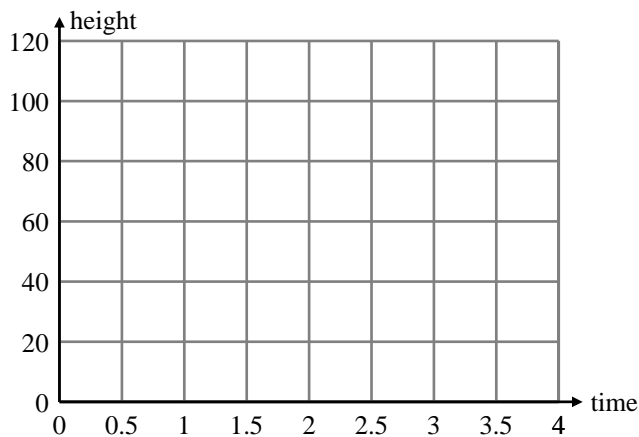
1. A student throws an object into the air and records the object's height as a function of time.

Time (sec)	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Height (ft)	6.0	44.5	75.0	97.5	112.0	118.5	117	107.5	90.0	64.5	31.0

A. Find the average velocity of the object between 0.5 and 2.5 seconds. What does the sign of your answer tell you about motion? What does the value tell you about velocity at 0.5 seconds? At 2.5 seconds?

B. The equation that best fits the data above is $f(t) = at^2 + bt + c$. Use the points corresponding to $t = 0, 1,$ and 2 to find the values of $a, b,$ and c .

C. Give a graphical representation of your answer in part A.



2. The following table was generated using the equation found in part B on the other side.

Time interval	Change in time	Change in height	Average velocity
	Symbol:	Symbol:	Symbol:
	Units:	Units:	Units:
0.5 to 0.6 sec	0.1	6.74	67.4
0.5 to 0.501 sec	0.001	0.06884	68.984
0.5 to 0.5001 sec	0.0001	0.00689984	68.9984
0.5 to 0.50001 sec	0.00001	0.000689985	68.99984
0.5 to 0.500001 sec	0.000001	0.00006899998	68.999984

A. Fill in the symbol and units for each column in the table.

B. What value does the change in time approach as you move down the column? What value does the change in height approach? What value does the average velocity approach? Express each in symbols.

C. What does the limiting value of the average velocity represent in practical terms? What does it represent in geometrical terms? Illustrate this limiting value on your graph in part C on the other side. Express the limiting value in symbols.

D. Find the equation of the tangent line to $f(t)$ at $t = 0.5$.