Using Position-Time graphs to find Acceleration.

Problem 2: Jennifer sprints and accelerates from rest to her top speed in 8.0 seconds with a displacement of 20 m [E]. Table 2 contains the position-time data from the starting position. Graph Jennifer's position-time data

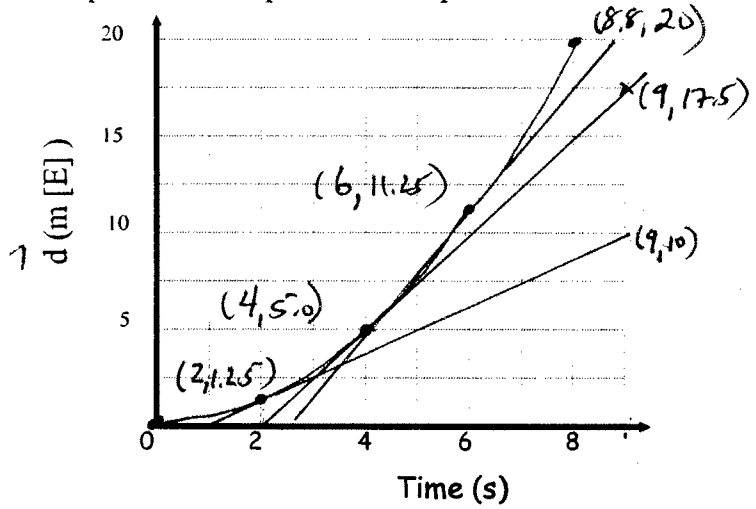


Table 2 :

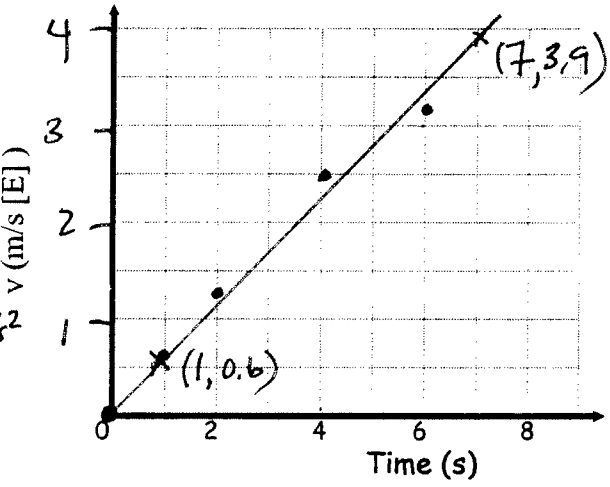
t (s)	$\vec{d}$ (m [E])
0.0	0.00
2.0	1.25
4.0	5.00
6.0	11.25
8.0	20.00

What can you conclude about position-time graphs of objects that accelerate uniformly? What is their shape? Write a concluding sentence below.

When an object accelerates uniformly the position-time graph...

Recall: The slope of a position time graph yields velocity. If the slope of the line on the position-time graph is gradually increasing, the velocity is also gradually increasing hence undergoing acceleration. **To find the slope of a curved line at a particular instant we draw the tangent at that instant. The slope of the tangent at that instant gives the instantaneous velocity at that instant.**

Produce Jennifer's velocity-time graph below.



$a = \frac{3.9 - 0.6}{7 - 1} = \frac{3.3}{6} = 0.55\ m/s^2\ [E]$

Show your calculations here:

$V_{1\,(2.05)} = \frac{10 - 1.25}{9 - 2} = \frac{8.75}{7} = 1.25\ \frac{m}{s}$ [E]

$V_{2\,(4.05)} = \frac{17.5 - 5.0}{9 - 4} = \frac{12.5}{5} = 2.5\ m/s$ (E)

$V_{3\,(6.9)} = \frac{20 - 11.25}{8.8 - 6} = \frac{8.75}{2.8} = 3.1\ m/s$ [E]

(0.05, 0.0 m/s)

To find the value of the uniform acceleration we take the slope of the velocity-time graph