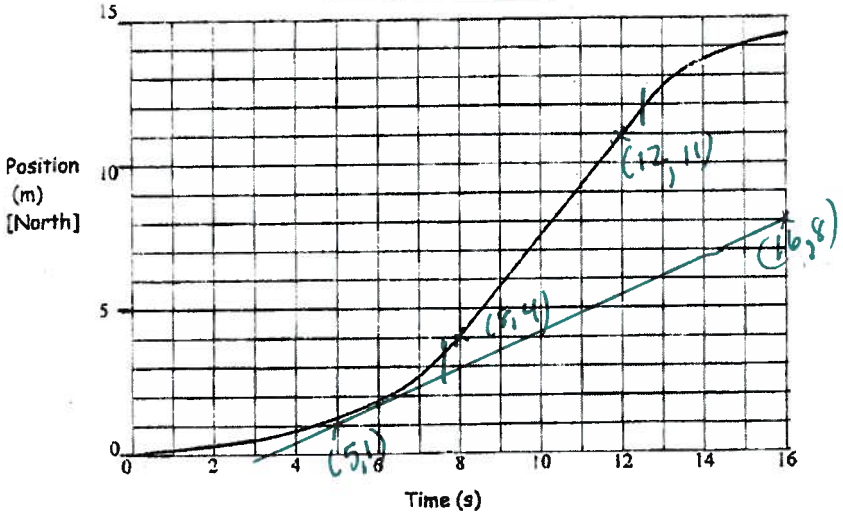
1. **Describing Motion**: Describe the motion of the objects shown in the following graphs.

i. Divide the graph plot into distinct regions of motion. ii. Identify the type of graph shown. iii. Describe the motion.

a) The graph below is a $\vec{d}-t$ graph showing the motion of a toy car.



Find the instantaneous velocity at:

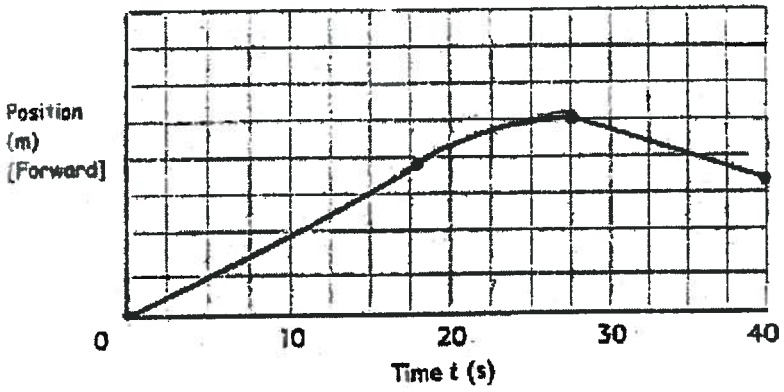
a) 6.0 s: $m = \frac{8-1}{16-5} = \frac{7}{11} = 0.64\frac{m}{s}[N)$

b) 10.0 s: 1.75 m/s

$m = \frac{11-4}{12-8} = \frac{7}{4} = 1.75 m/s [N)$

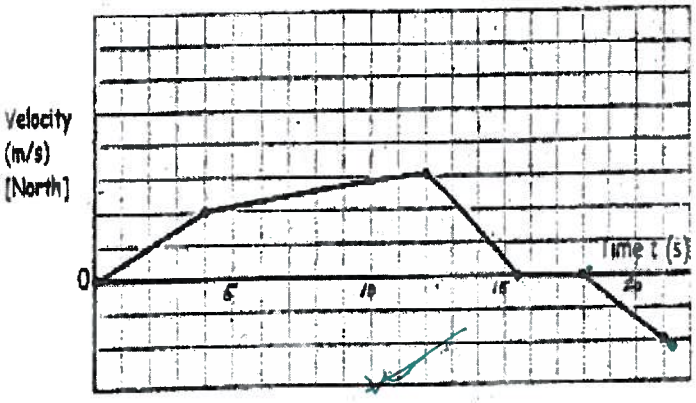
	Interval 1	Interval 2	Interval 3
Direction of Motion	N	N	N
Towards or away from the origin	A	A	A
Velocity magnitude (constant, increasing, decreasing, zero)	I	C	D

b) The graph is a $\vec{d}-t$ graph.



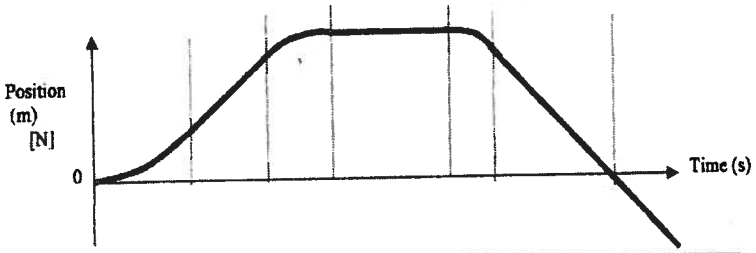
Interval	1	2	3
Direction of of Motion	F	F	B
Moving towards or away from origin	A	A	T
Speed Description (constant, speeding up, slowing down)	Const	Slowing	Constant

c) The graph is a $\vec{v}-t$ graph.



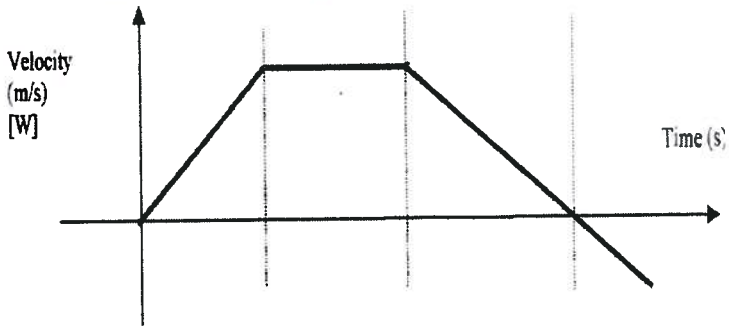
Interval	1	2	3	4	5
Direction of of Motion	N	N	N		S
Speed Description	Speeding up	Speed up	Slowing down.	Not moving	Speeding up

d) The graph is a $\vec{d}$-t graph.



	Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7
Direction of motion	N	N	N	/	S	S	S
Moving towards or away from origin	A	A	A	Ar Rest	T	T	A
Velocity magnitude (constant, increasing, decreasing)	inc	const	Dec	/	inc	const	const

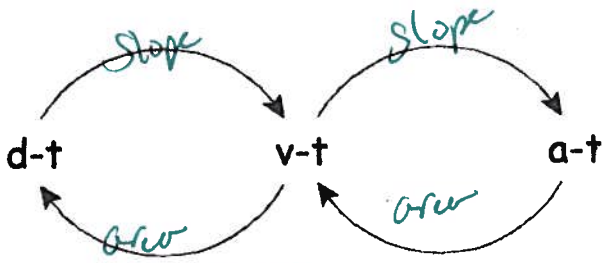
e) The graph is a $\vec{v}$-t graph



	Interval 1	Interval 2	Interval 3	Interval 4
Direction of motion	W	W	W	E
Velocity magnitude (constant, increasing, decreasing)	Dec	const	Dec	inc

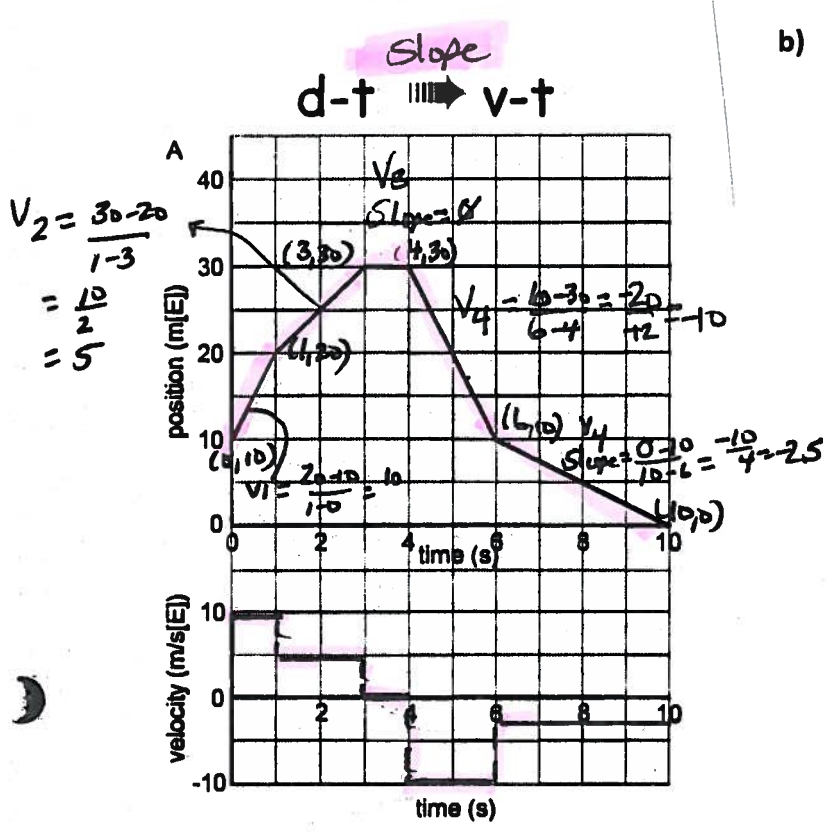
2. Moving Between Graphs

Complete the following diagram to the right that relates position-time ($\vec{d}$-t), velocity-time (v-t), and acceleration-time (a-t) graphs.

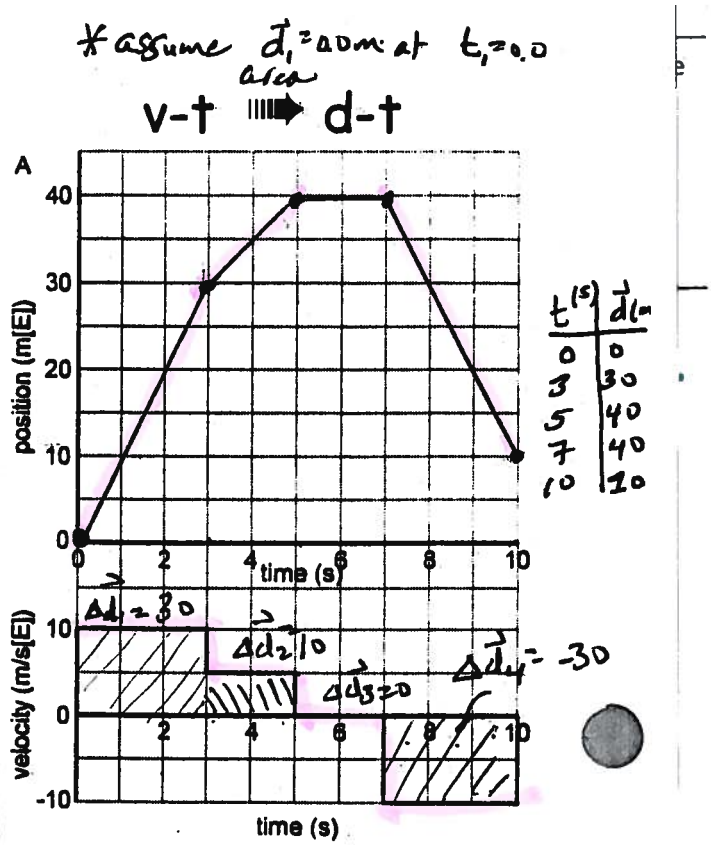


Remember that "Area" IS CUMULATIVE!!

Draw the missing graph:



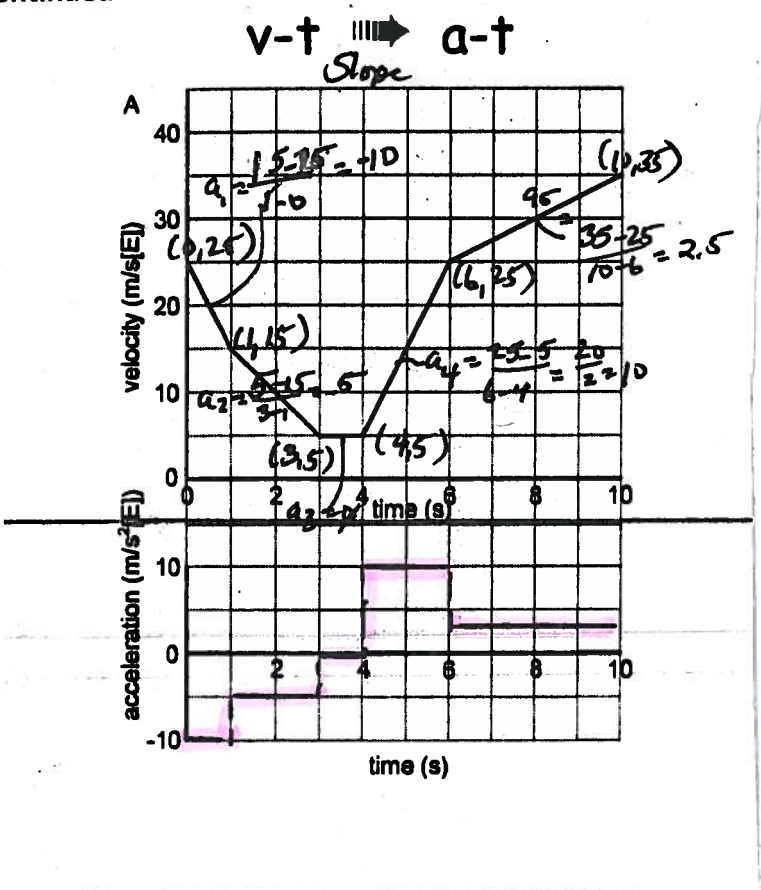
b)



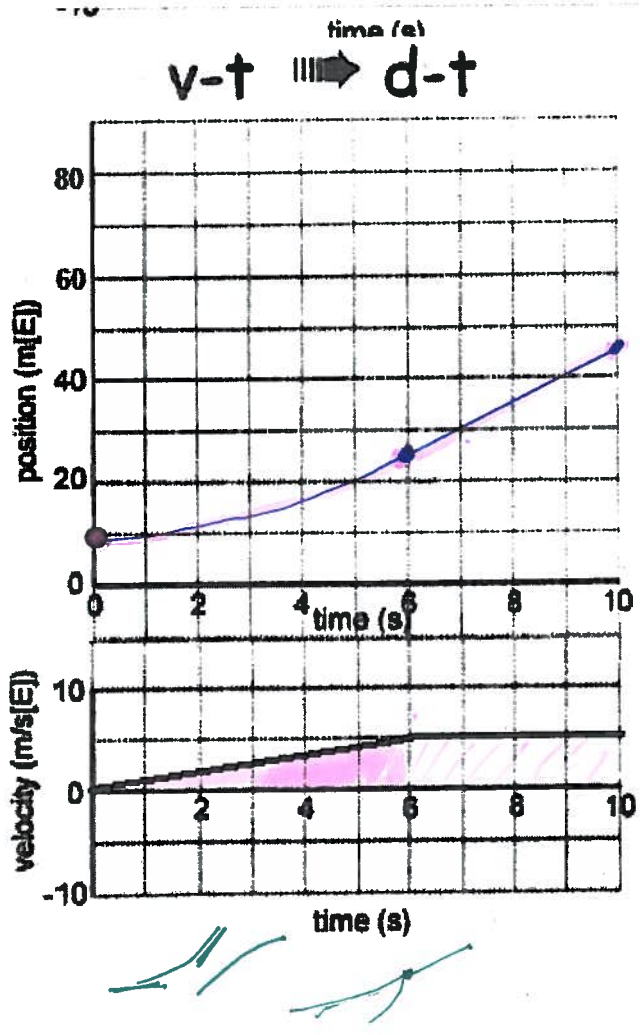
2. Continued

Calculations:

c)



d)



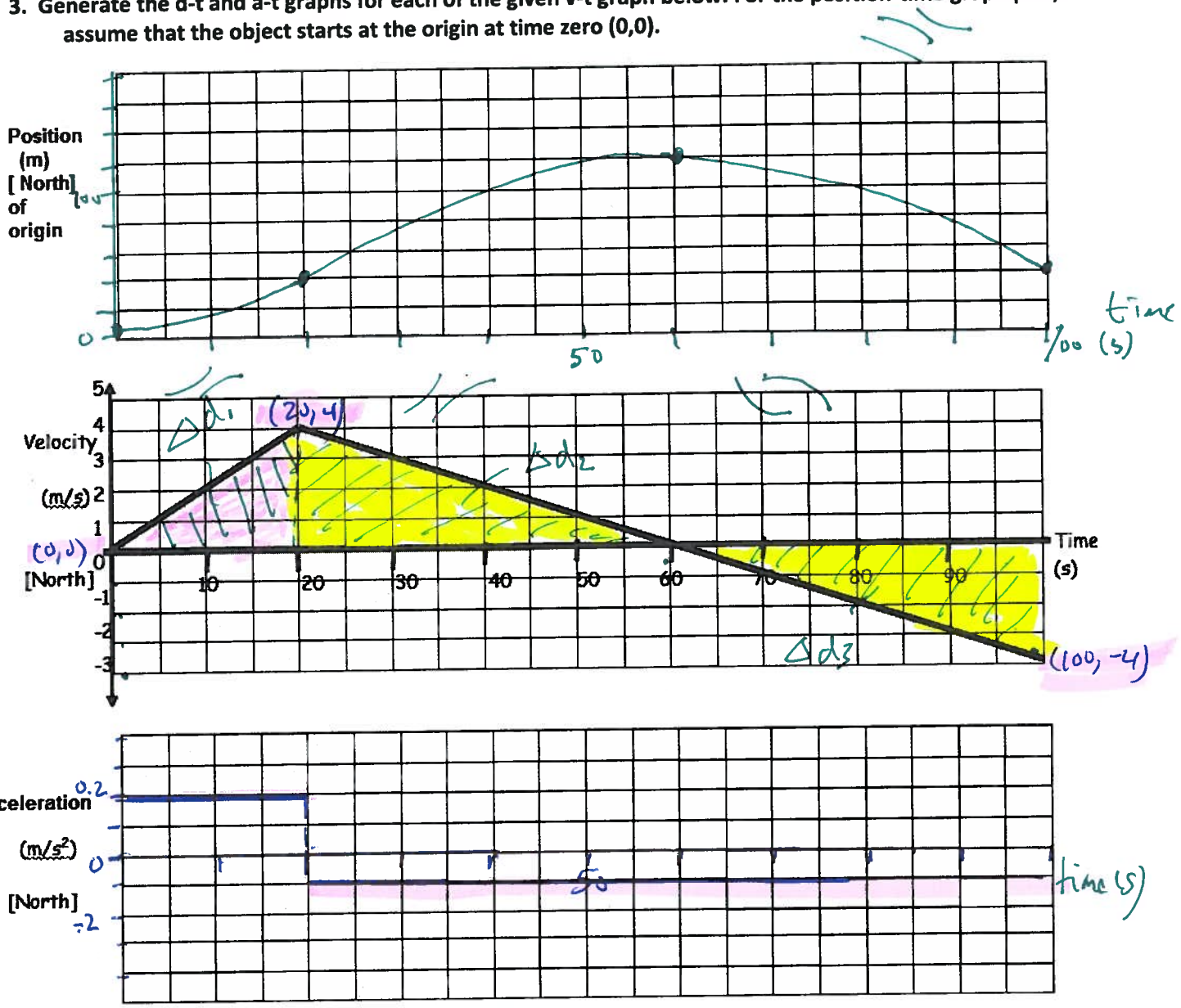
Assume the object starts 10.0 m E of origin at time zero.

$\Delta\vec{d}_1 = \frac{1}{2}(5)(6) = 15.0\text{m}$

$\Delta\vec{d}_2 = (5)(4) = 20.0\text{m}$

t(s)	$\vec{d}$(m)E
0	10.0
6	25.0
10	45.0

3. Generate the d-t and a-t graphs for each of the given v-t graph below. For the position-time graph plot, assume that the object starts at the origin at time zero (0,0).



Calculations:

v-t to a-t:

$\vec{a}_1 = \frac{4-0}{20-0} = 0.20$

$\vec{a}_2 = \frac{-4-4}{100-20} = \frac{-8}{-80} = -0.10$

v-t to d-t: (* Include a t-chart!!)

$\Delta\vec{d}_1 = \frac{1}{2}(4)(20) = 40.0\ m\ [N]$

$\Delta\vec{d}_2 = \frac{1}{2}(4)(40) = 80.0\ m\ [N]$

$\Delta\vec{d}_3 = \frac{1}{2}(-4)(40) = -80.0\ m\ [N]$
$80.0\ m\ [S]$

t (s)	$\vec{d}$m (N)
0	0 m
20.	40. m
60.	120.0 m
100	40.0 m

Describe the motion of the object:

Interval 1:

Interval 2:

Interval 3: