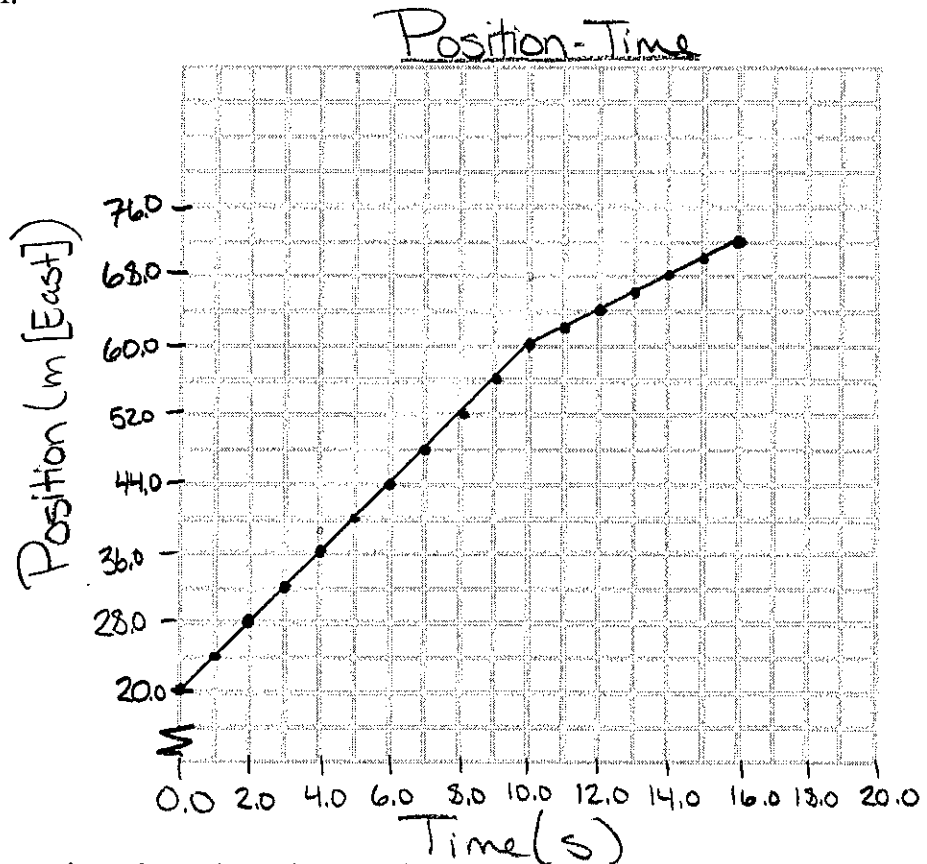


**Physics 20**  
1.1-1.4 Assignment

Name: Key

1. Position Time Graph:

Time (s)	Position (m, East)
0.0	20.0
1.0	24.0
2.0	28.0
3.0	32.0
4.0	36.0
5.0	40.0
6.0	44.0
7.0	48.0
8.0	52.0
9.0	56.0
10.0	60.0
11.0	62.0
12.0	64.0
13.0	66.0
14.0	68.0
15.0	70.0
16.0	72.0



Answer the following questions based on the graph.

- a. What does the shape of the graph tell you about the motion of the object?

Uniform Motion

- b. What is the velocity at 5.0 s?

$$\vec{v} = \frac{\Delta \vec{d}}{\Delta t} = \frac{+40\text{m} - +20\text{m}}{5.0\text{s} - 0.0\text{s}} = \boxed{4.0\text{ m/s [East]}}$$

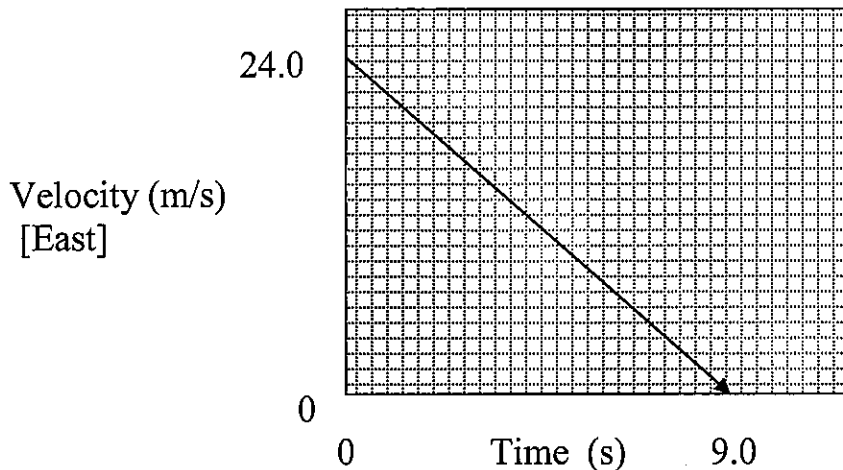
- c. What is the velocity at 13.0 s?

$$\vec{v} = \frac{\Delta \vec{d}}{\Delta t} = \frac{+66.0\text{m} - +60.0\text{m}}{13.0\text{s} - 10.0\text{s}} = \boxed{2.0\text{ m/s [East]}}$$

- d. What is the average velocity?

$$\vec{v}_{\text{ave}} = \frac{\Delta \vec{d}}{\Delta t} = \frac{+72.0\text{m} - +20.0\text{m}}{16.0\text{s} - 0.0\text{s}} = \boxed{3.3\text{ m/s [East]}}$$

2. Given the velocity vs. time graph:



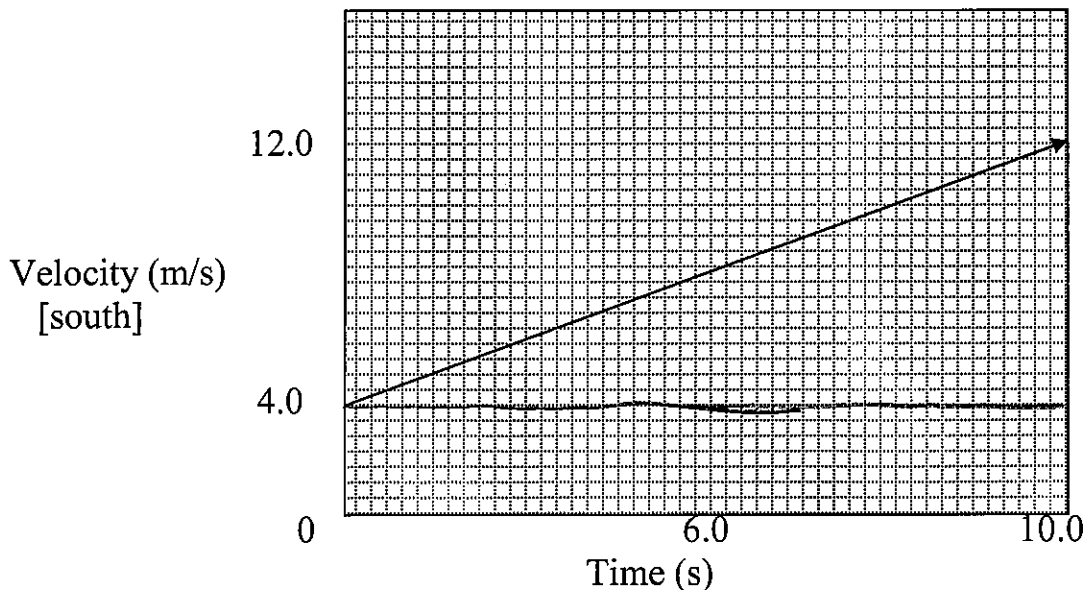
a. What is the average acceleration?

$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t} = \frac{0 \text{ m/s} - 24.0 \text{ m/s}}{9.0 \text{ s} - 0.0 \text{ s}} = \boxed{-2.7 \text{ m/s}^2}$$

b. What is the change in displacement?

$$\Delta d = \frac{bh}{2} = \frac{\vec{v}t}{2} = \frac{24.0 \text{ m/s} \cdot 9.0 \text{ s}}{2} = \boxed{1.1 \times 10^2 \text{ m}}$$

3. Given the following Velocity - Time graph:



a. Find the acceleration at 6.0 s?

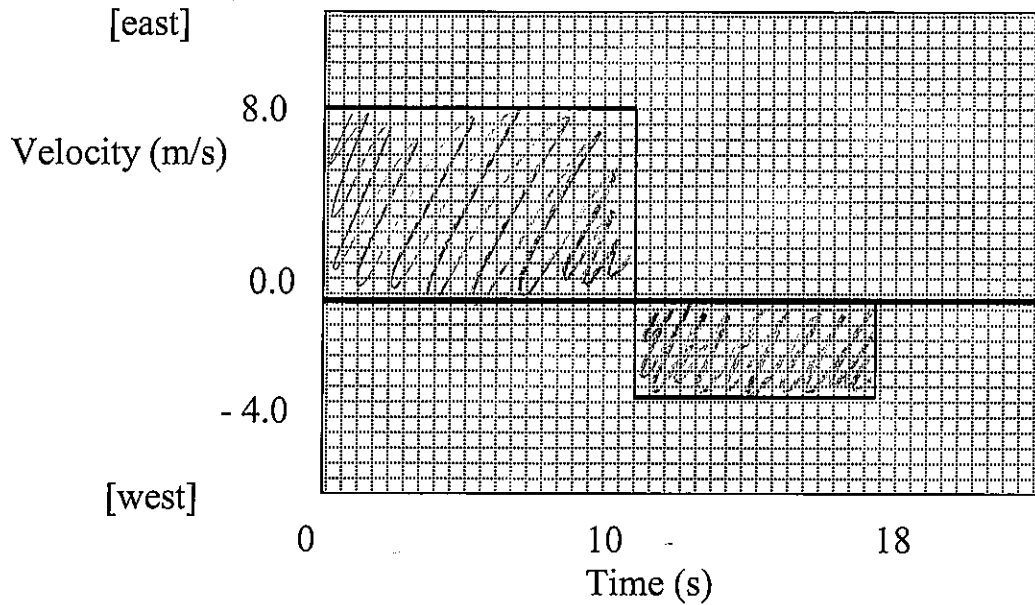
$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t} = \frac{12.0 \text{ m/s} - 4.0 \text{ m/s}}{10.0 \text{ s} - 0.0 \text{ s}} = \boxed{0.80 \text{ m/s}^2}$$

b. What is the total displacement after 10.0 s?

$$\vec{J} = \text{area under curve} = lw + \frac{bh}{2}$$

$$= (10.0 \text{ s} \cdot 4.0 \text{ m/s}) + \frac{(10.0 \text{ s} \cdot 8.0 \text{ m/s})}{2} = \boxed{70 \text{ m}}$$

4. Consider the following velocity – time graph:

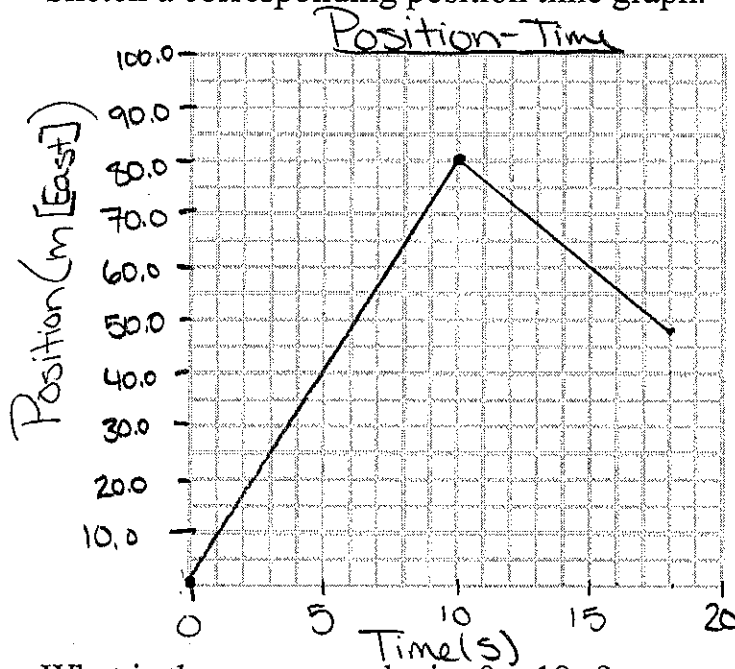


a. From the graph what is the total displacement?

$$\vec{d} = lw + lw = (10.0s \cdot 8.0m/s) + (8.0s \cdot -4.0m/s)$$

$$= 80m + -32m = \boxed{+48m}$$

b. Sketch a corresponding position time graph.



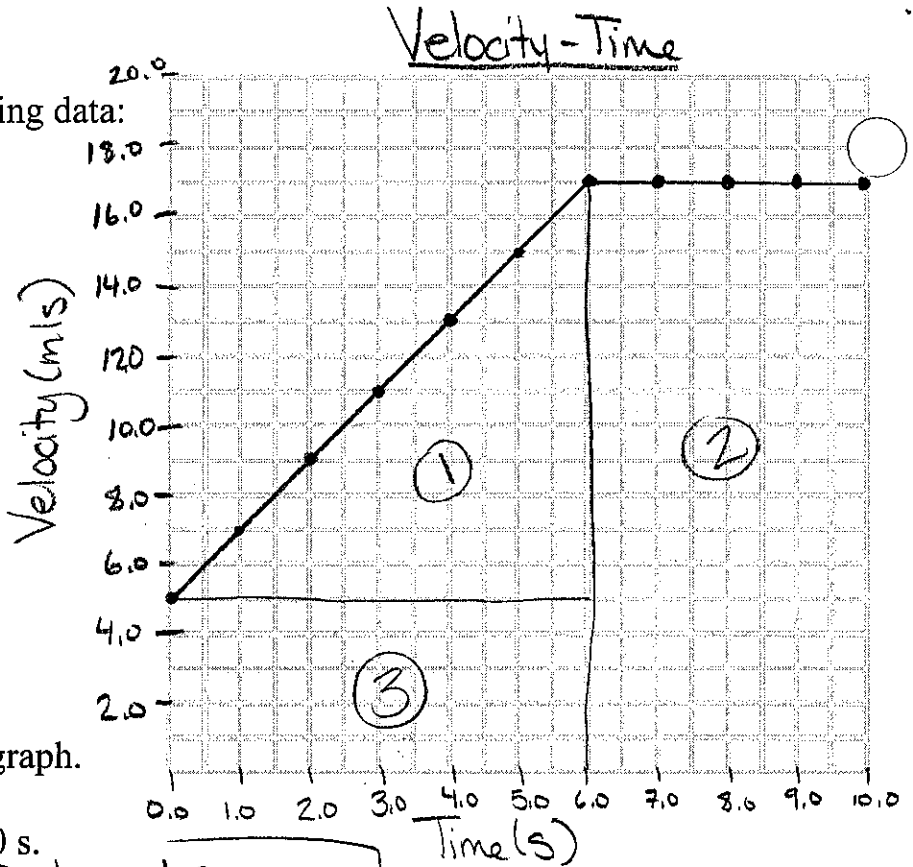
$$= \boxed{48m \text{ [East]}}$$

c. What is the average velocity 0 – 18 s?

$$\vec{v}_{\text{ave}} = \frac{\Delta \vec{d}}{\Delta t} = \frac{48m}{18s} = \boxed{2.7 \text{ m/s [East]}}$$

5. Consider the following data:

Time (s)	Velocity (m/s)
0.0	5.0
1.0	7.0
2.0	9.0
3.0	11.0
4.0	13.0
5.0	15.0
6.0	17.0
7.0	17.0
8.0	17.0
9.0	17.0
10.0	17.0



a. Construct a velocity time graph.

b. Find the acceleration at 3.0 s.

$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t} = \frac{11.0 \text{ m/s} - 5.0 \text{ m/s}}{3.0 \text{ s} - 0.0 \text{ s}} = 2.0 \text{ m/s}^2$$

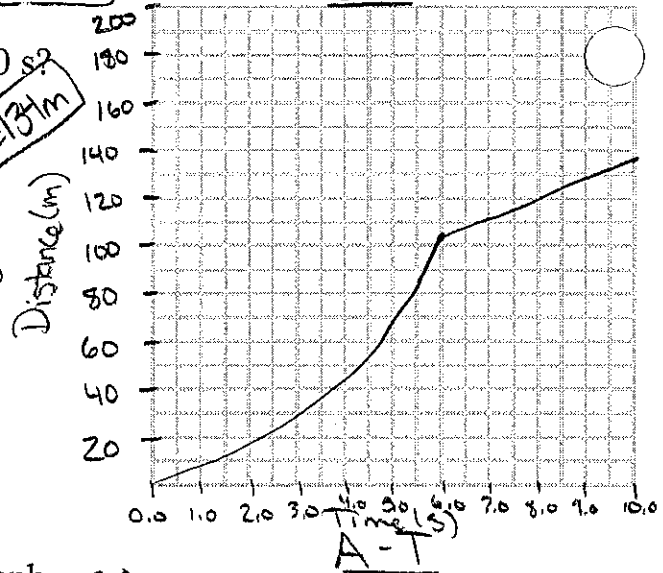
c. What is the total distance traveled in the 10.0 s?

$$\textcircled{1} d = \frac{bh}{2} = \frac{(6.0 \text{ s} \cdot 12.0 \text{ m/s})}{2} = 36 \text{ m}$$

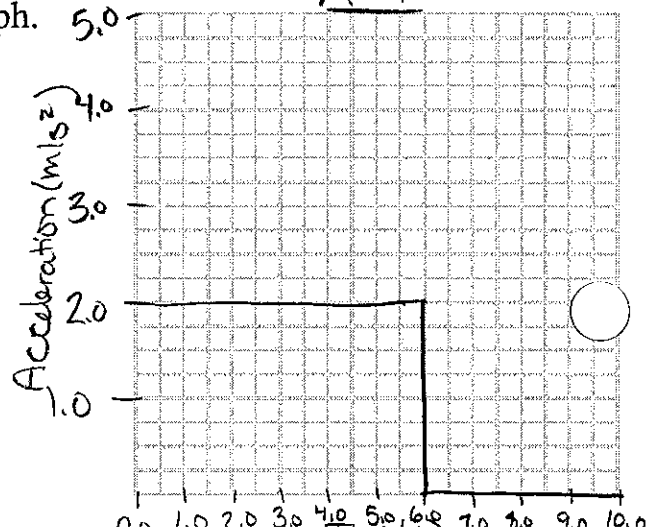
$$\textcircled{2} d = lw = 17.0 \text{ m/s} \cdot 4.0 \text{ s} = 68 \text{ m}$$

$$\textcircled{3} d = lw = (6.0 \text{ s} \cdot 5.0 \text{ m/s}) = 30 \text{ m}$$

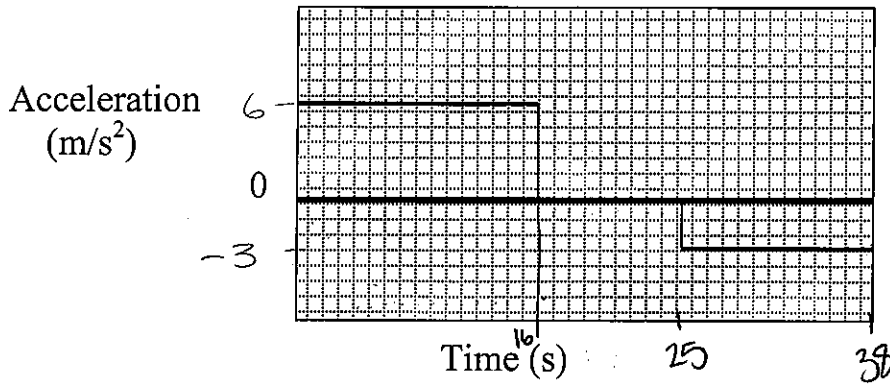
d. Sketch a corresponding distance time graph



e. Sketch a corresponding acceleration time graph.



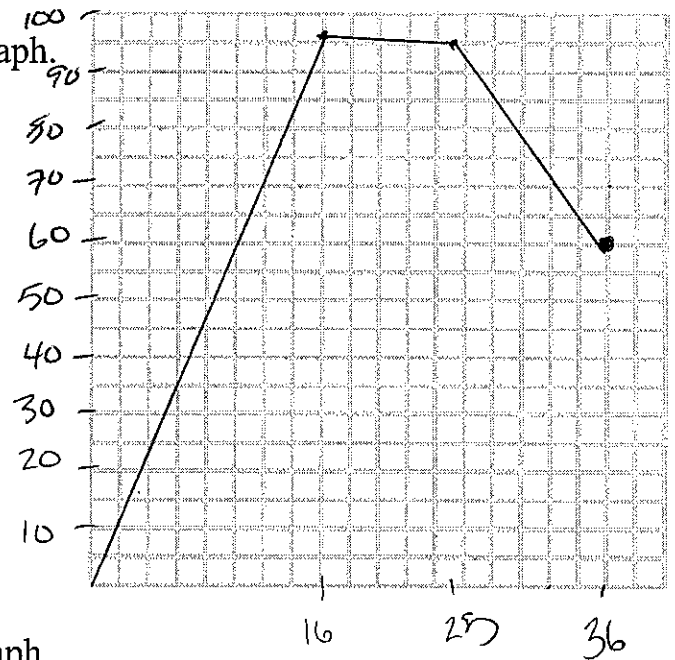
6. Consider the following acceleration graph:



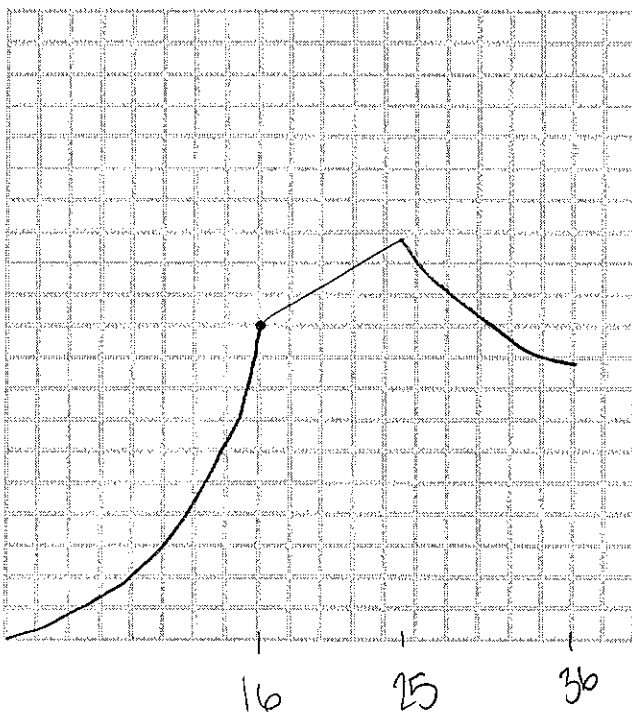
a. Sketch the corresponding velocity-time graph.

$$\vec{v} = bh = 16s \cdot 6 \text{ m/s}^2 = 96 \text{ m/s}$$

$$\vec{v} = bh = 13s \cdot -3 \text{ m/s}^2 = -39 \text{ m/s}$$



b. Sketch the corresponding position time graph.

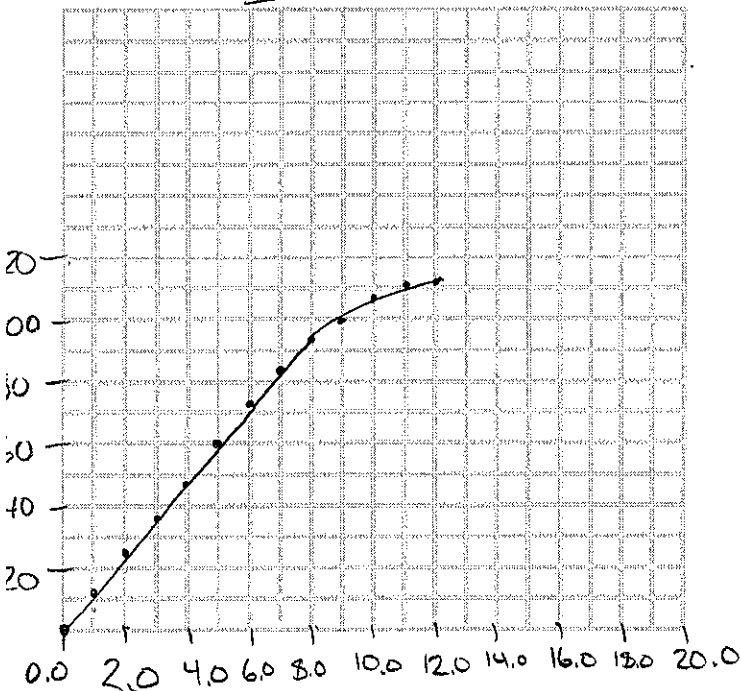


7. Consider the following data.

Time (s)	Position (m)	$\Delta d$ (m)	V (m/s)
0.0	0.0	0.0	0.0
1.0	12.0	12.0	12.0
2.0	24.0	12.0	12.0
3.0	36.0	12.0	12.0
4.0	48.0	12.0	12.0
5.0	60.0	12.0	12.0
6.0	72.0	12.0	12.0
7.0	83.0	11.0	11.9
8.0	92.0	9.0	11.5
9.0	99.0	7.0	11.0
10.0	104.0	5.0	10.4
11.0	107.0	3.0	9.73
12.0	108.0	1.0	9.00

- Graph position vs. time.
- Describe the motion.
- Complete the data table above.
- Graph the velocity vs. time.
- From the graph find the acceleration.

P-T



Time (s)  
 0-6 constant  $\vec{v}$   
 6-12 slowdown

V-T

