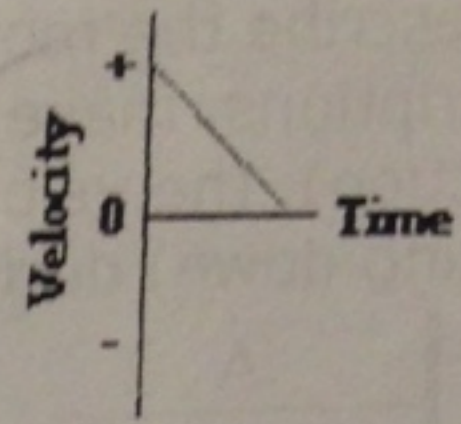


3. Consider the graph at the right. The object whose motion is represented by this graph is ... (include all that are true):



a. moving in the positive direction.

b. moving with a constant velocity.

c. moving with a negative velocity.

d. slowing down.

e. changing directions.

f. speeding up.

g. moving with a positive acceleration.

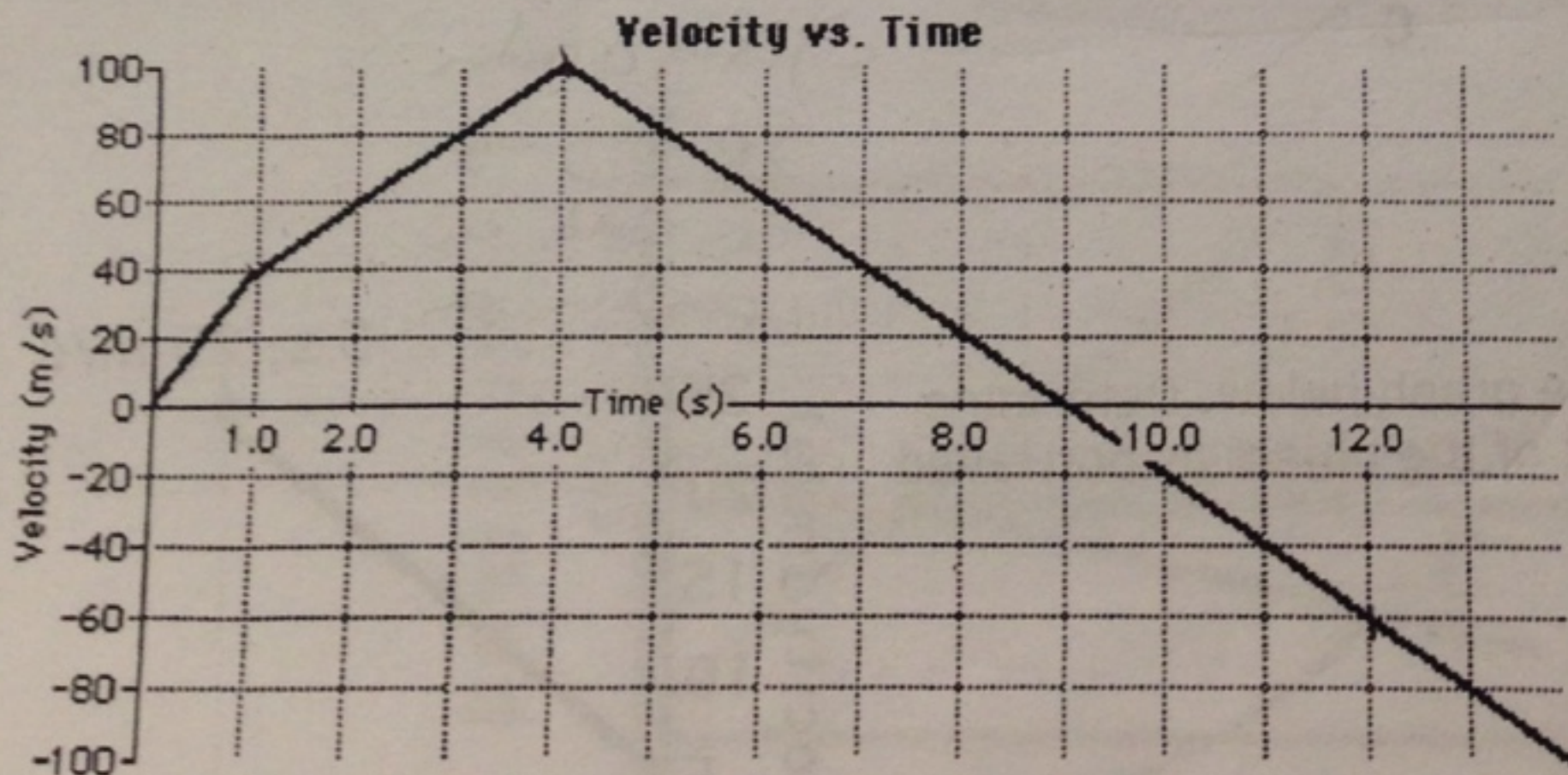
h. moving with a constant acceleration.

4. The velocity-time graph for a two-stage rocket is shown below. Use the graph and your understanding of slope calculations to determine the acceleration of the rocket during the listed time intervals.

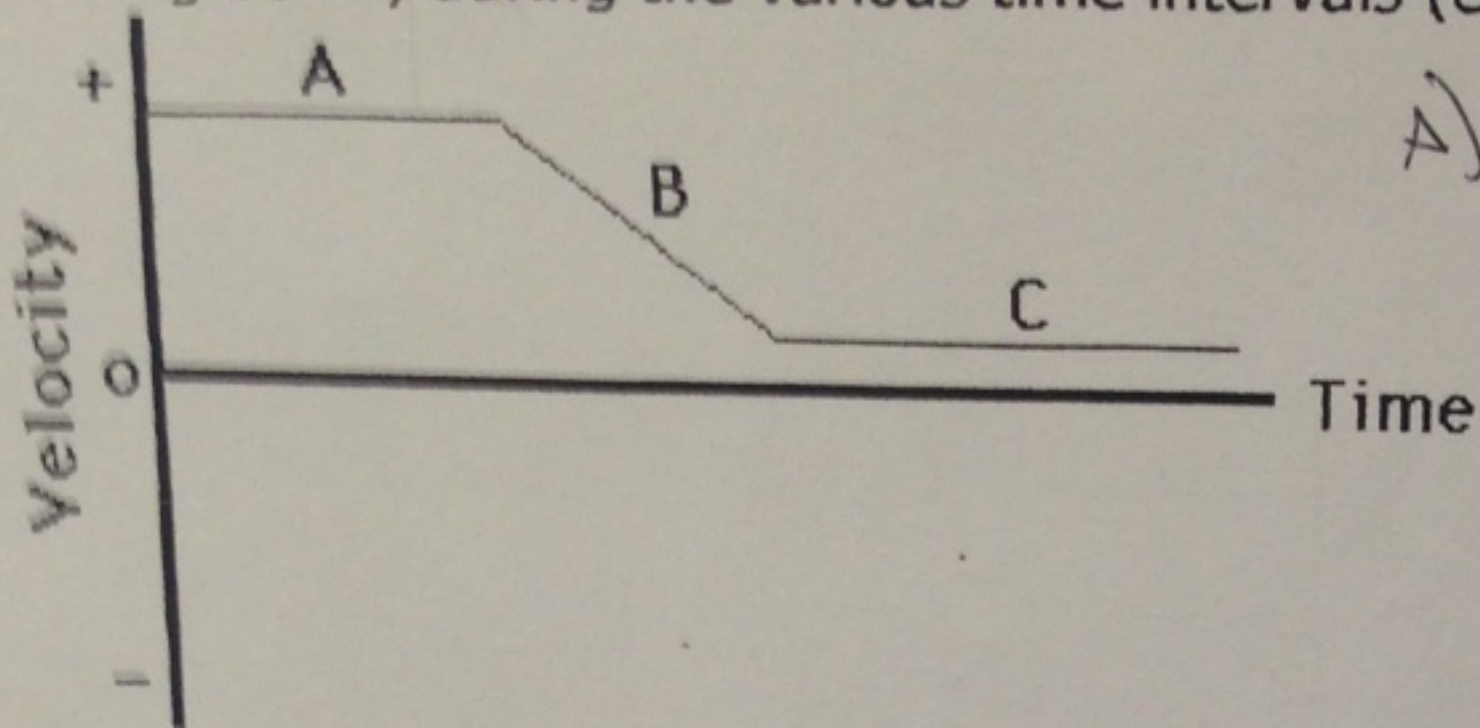
a. $t = 0 - 1$ second $a = 40 \text{ m/s}^2$

b. $t = 1 - 4$ seconds $a = 20 \text{ m/s}^2$

c. $t = 4 - 12$ seconds $a = -20 \text{ m/s}^2$



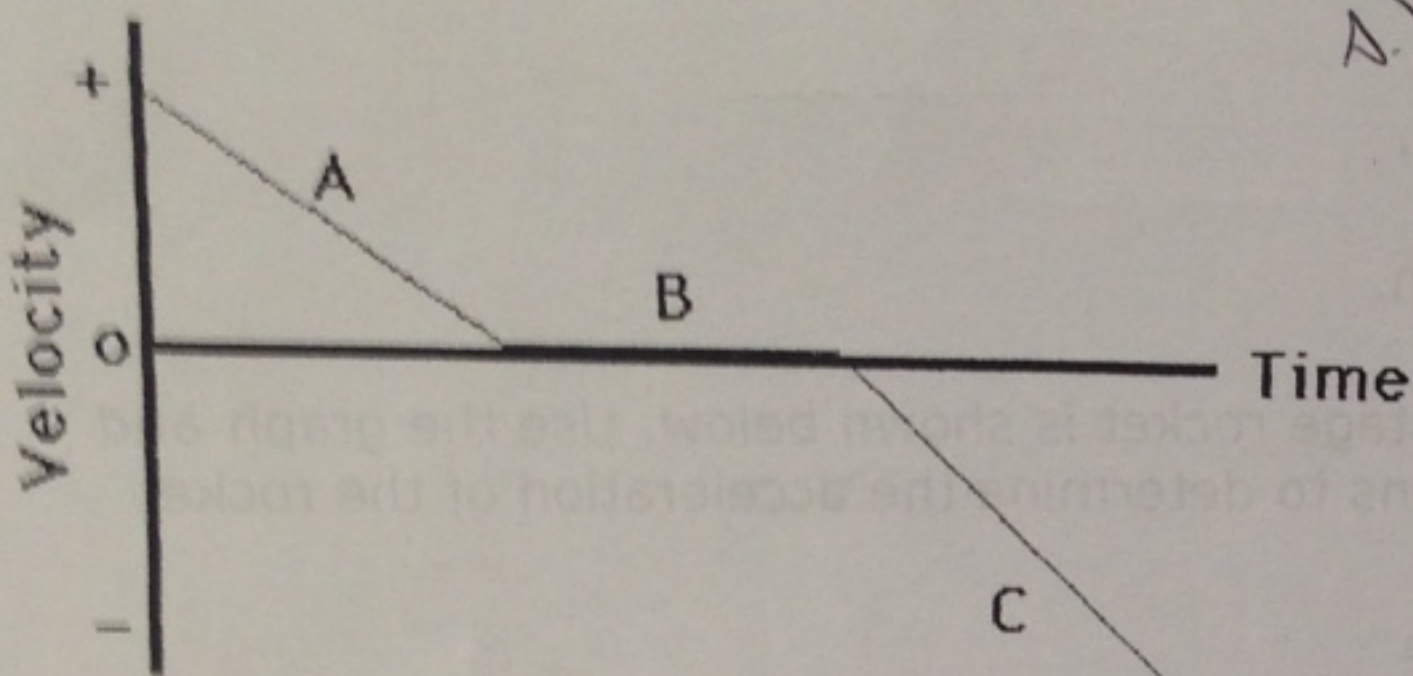
5. Describe the motion depicted by the following velocity-time graphs. In your descriptions, make reference to the direction of motion (positive or negative direction), the velocity, the acceleration and any changes in speed (speeding up or slowing down) during the various time intervals (e.g., intervals A, B, and C).



A) - positive
- constant v
- no acceleration

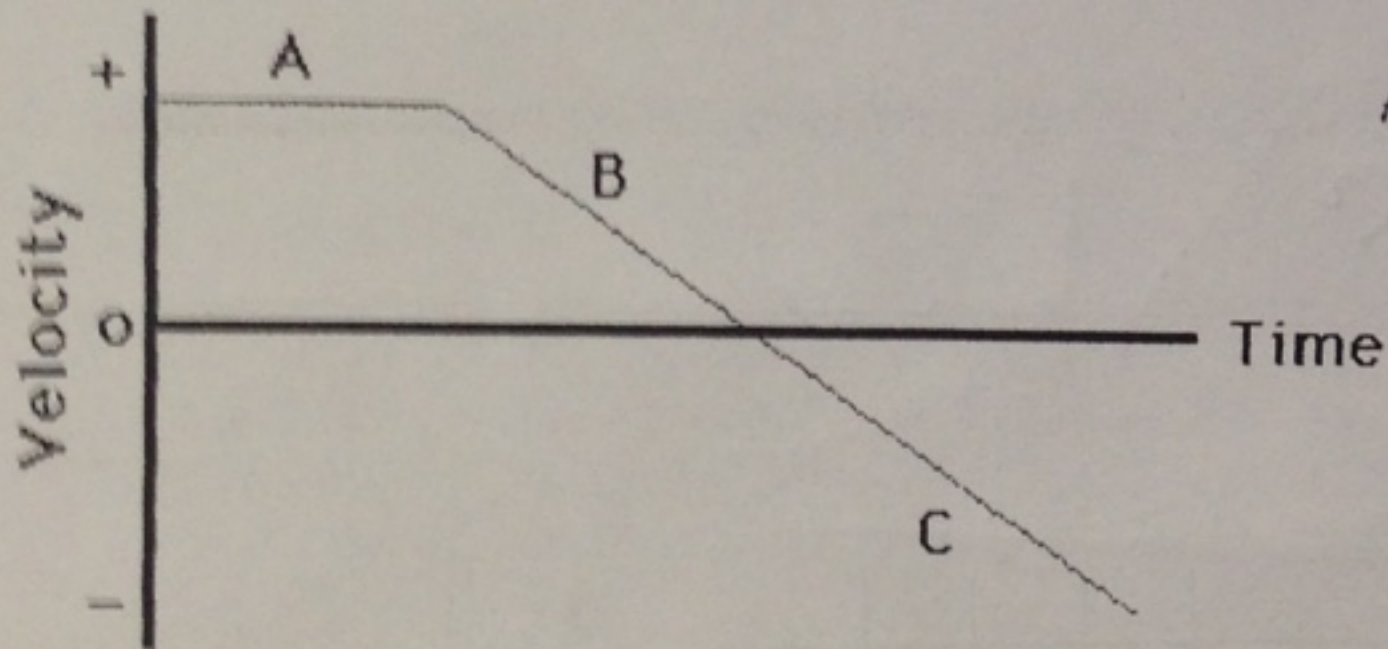
B) - positive
- slowing down
- negative a
- constant a

C) - positive
- constant v
- no acceleration



A) - positive
- slowing down
- neg a
- constant a

B) - stopped
C) - Neg direction
- speeding up
- constant a
- positive a



A) - positive
- constant v
- no a

B) - Slowing down
- positive
- neg a
- constant a
- reaches 0 v (stopped)

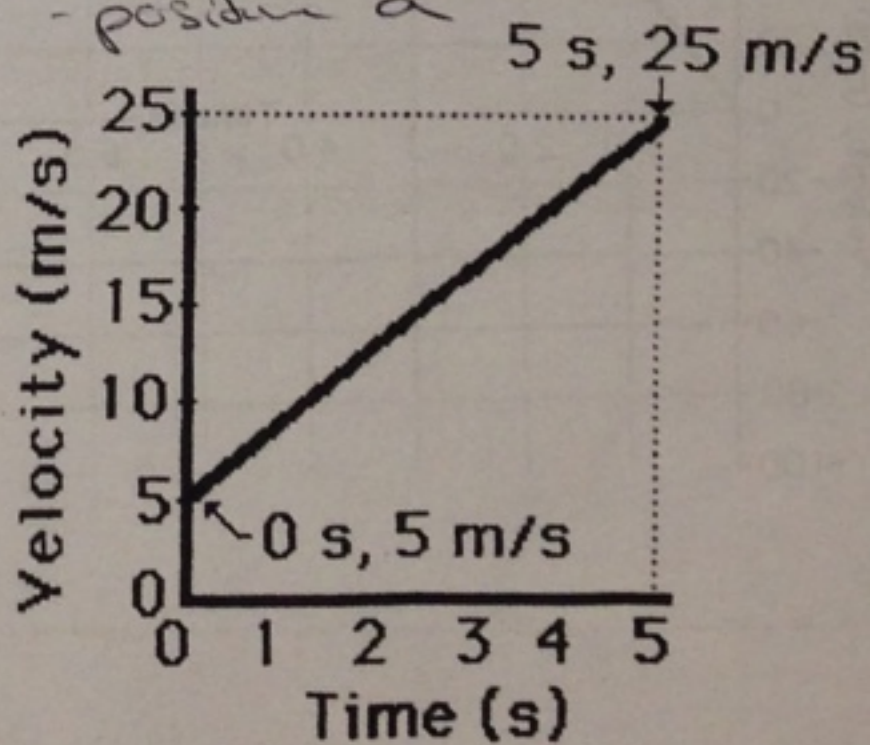
C) - Neg direction
- speeding up
- constant a
- positive a

6. Consider the velocity-time graph below. Determine the acceleration (i.e., slope) of the object as portrayed by the graph.

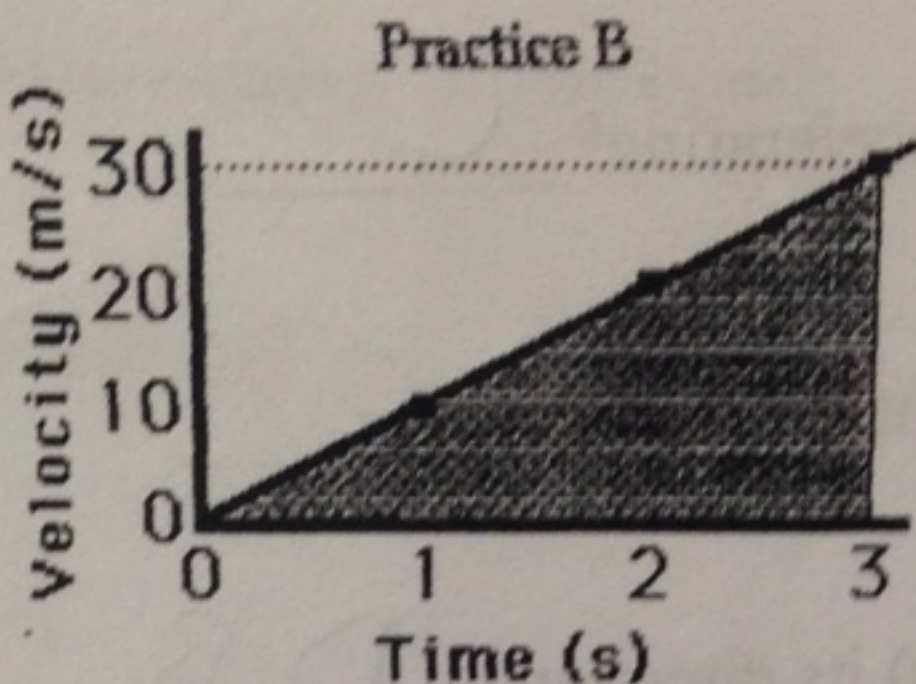
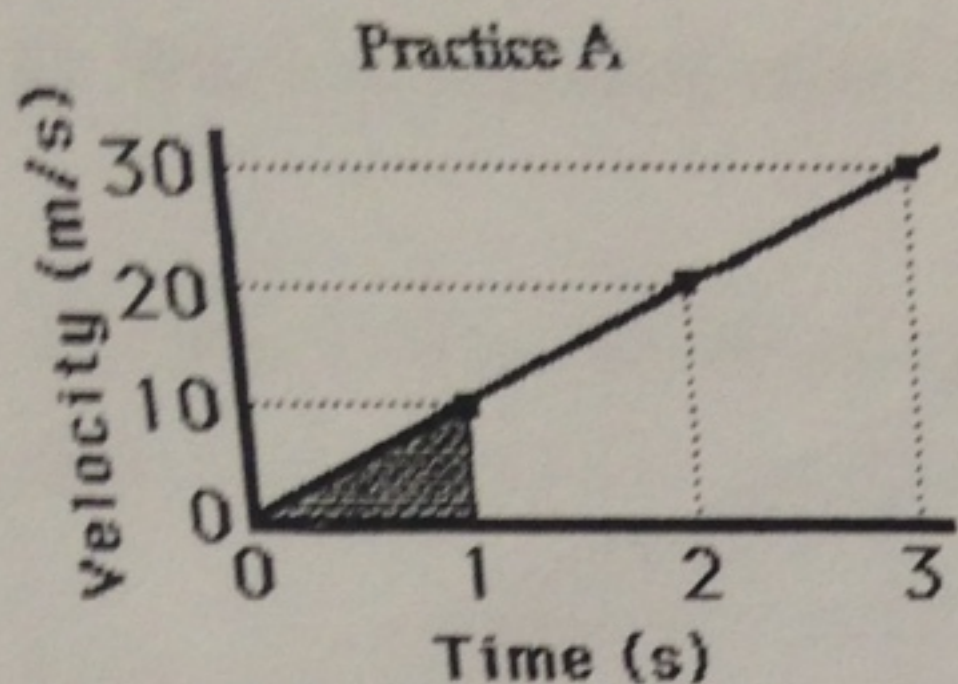
$$a = \frac{25 - 5}{5 - 0}$$

$$a = \frac{20}{5}$$

$$a = 4 \text{ m/s}^2$$



7. Check your understanding by finding the distance traveled by the object in each of the following cases.



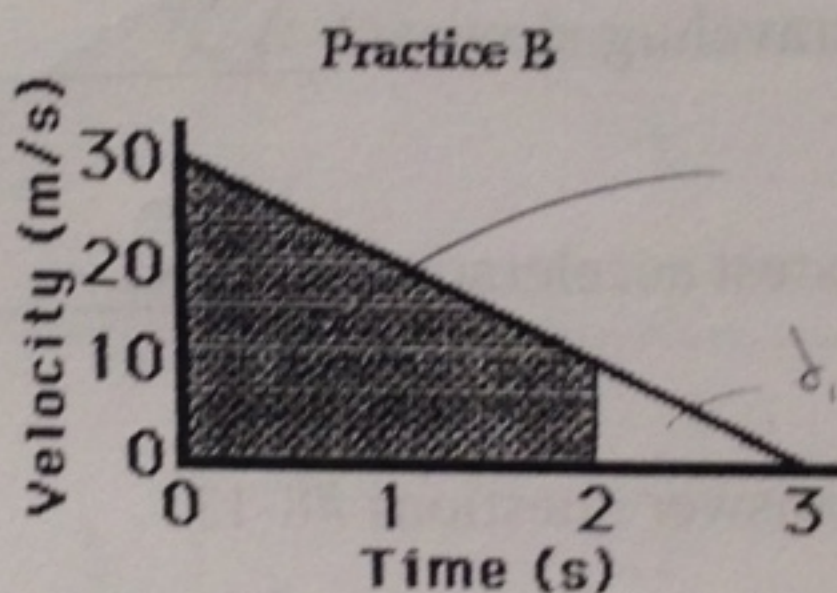
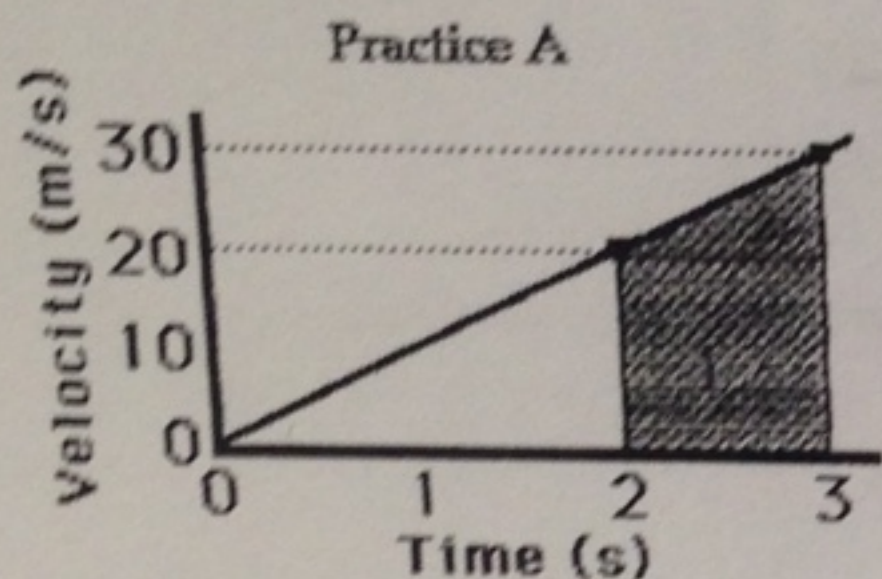
A) $d = \frac{10 \times 1}{2}$

$d = 5m$

B) $d = \frac{30 \times 3}{2}$

$d = 45m$

8. Now check your understanding by finding the distance traveled by the object in each of the following cases.



$d_1 = 20 \times 1$ $d_2 = \frac{10 \times 1}{2}$
 $d_1 = 20m$ $d_2 = 5m$

Part 5

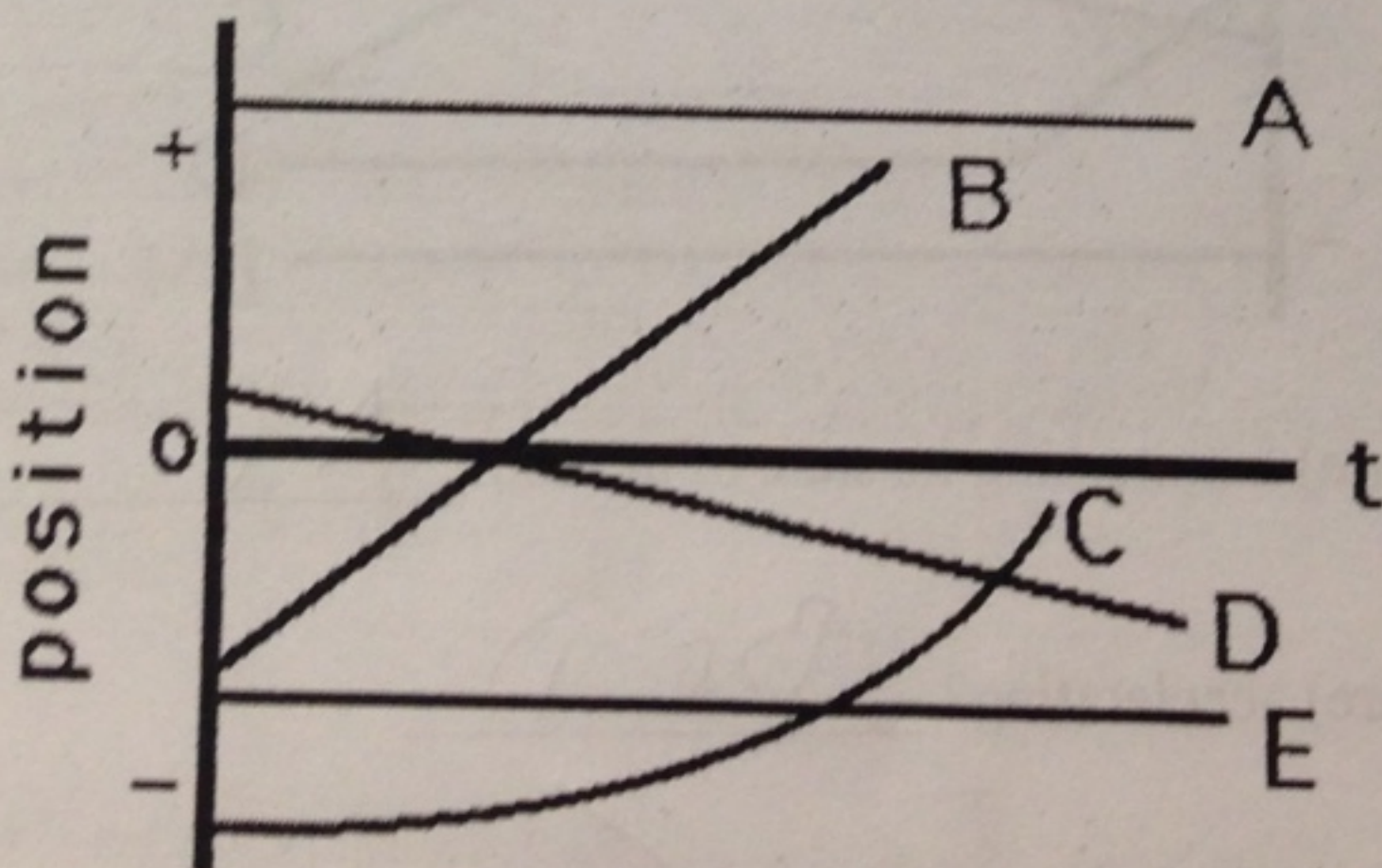
$d_T = 25m$

$d_T = \frac{30 \times 3}{2}$
 $d_T = 45m$

$d_1 = \frac{10 \times 1}{2}$
 $d = 5m$

$d = 45 - 5$
 $d = 40m$

(A) Use the following graph to answer questions #1-6.



1. Which object(s) is(are) maintaining a state of motion (i.e., maintaining a constant velocity)? B, D

2. Which object(s) is(are) accelerating? C

3. Which object(s) is(are) not moving? A, E

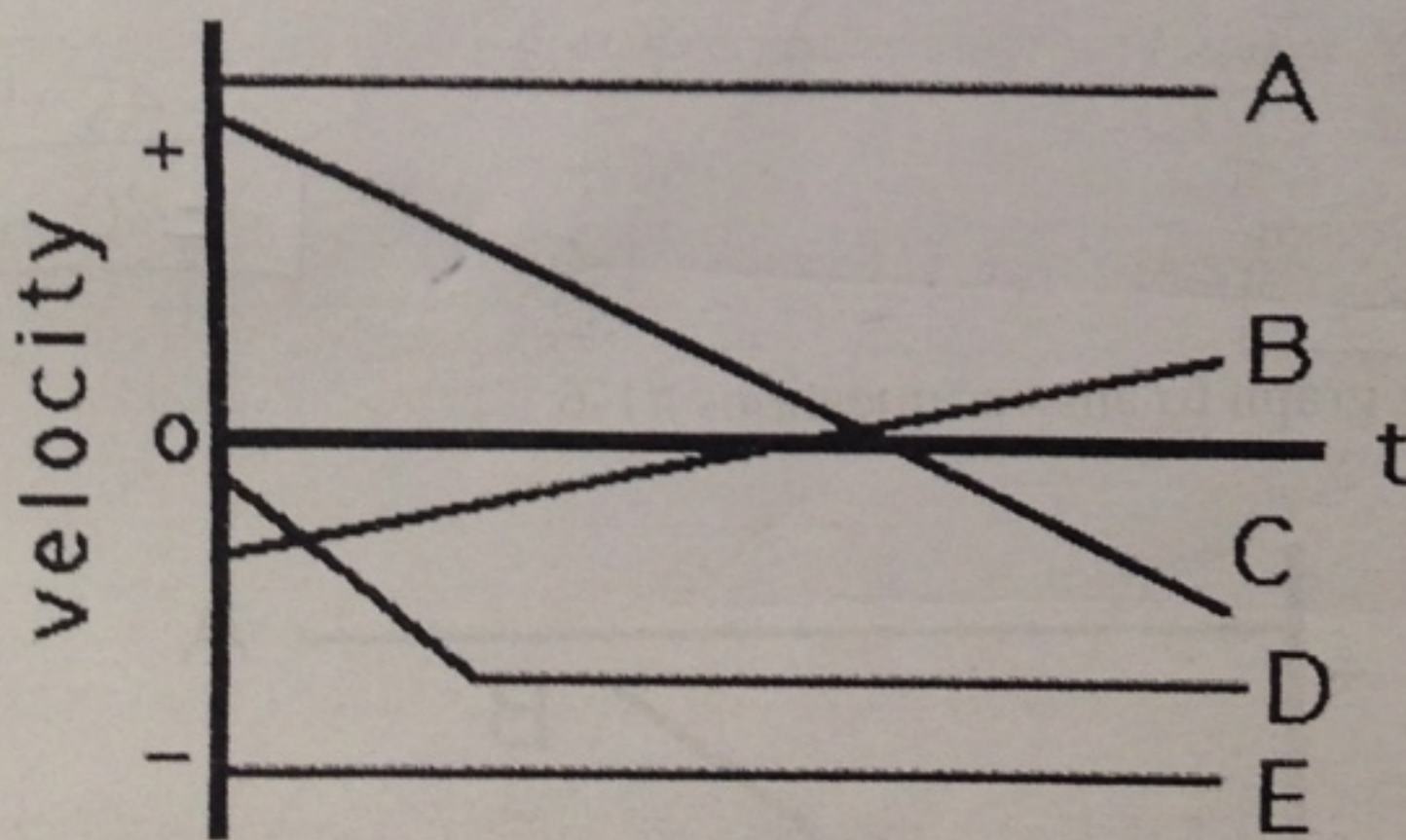
4. Which object(s) change(s) its direction? D, B

5. Which object is traveling fastest? B

6. Which moving object is traveling slowest? D

7. Which object has the greatest acceleration? C

Use the following graph to answer questions #8-13.



8. Which object(s) is(are) maintaining its state of motion? A, E

9. Which object(s) is(are) accelerating? B, C, D

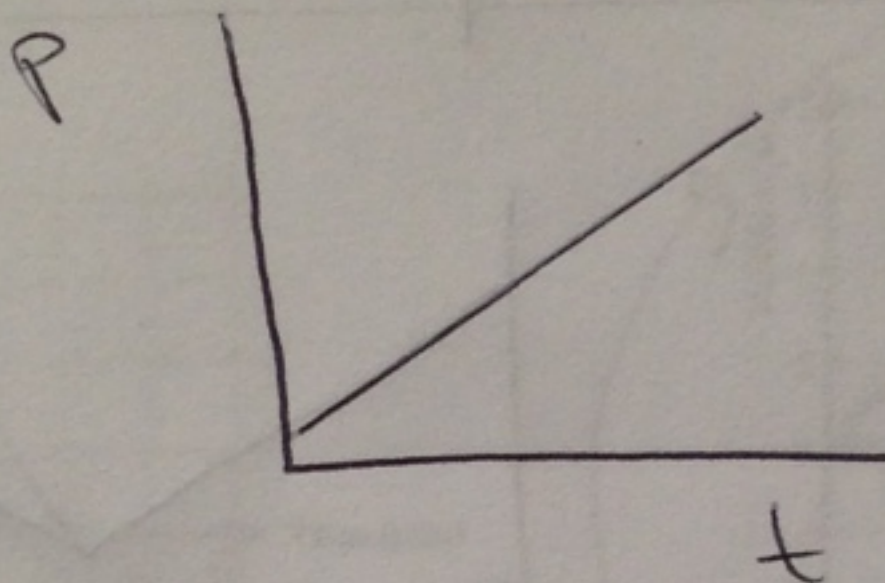
10. Which object(s) is(are) not moving? /

11. Which object(s) change(s) its direction? B, C

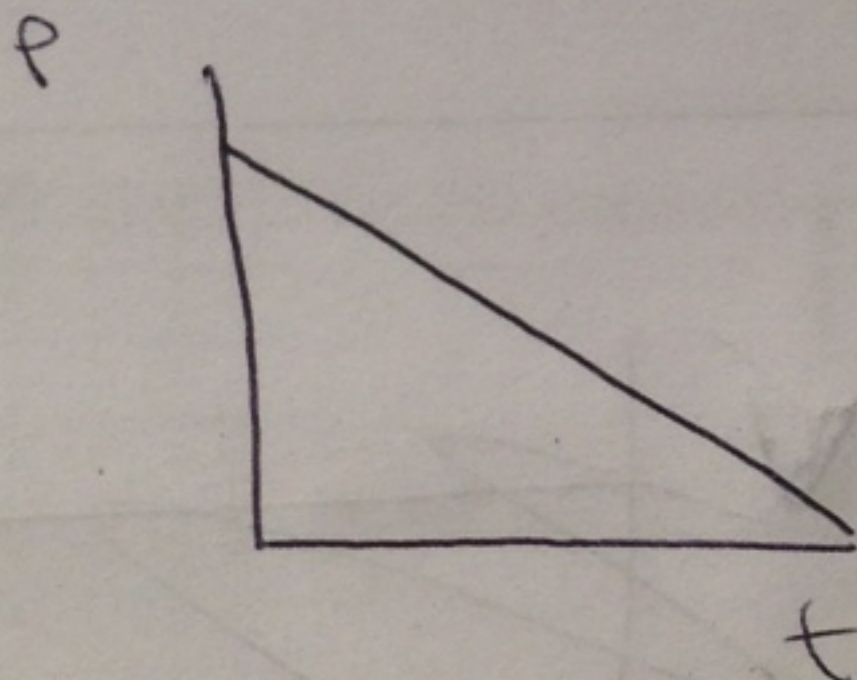
12. Which accelerating object has the smallest acceleration? B

13. Which object has the greatest velocity? A

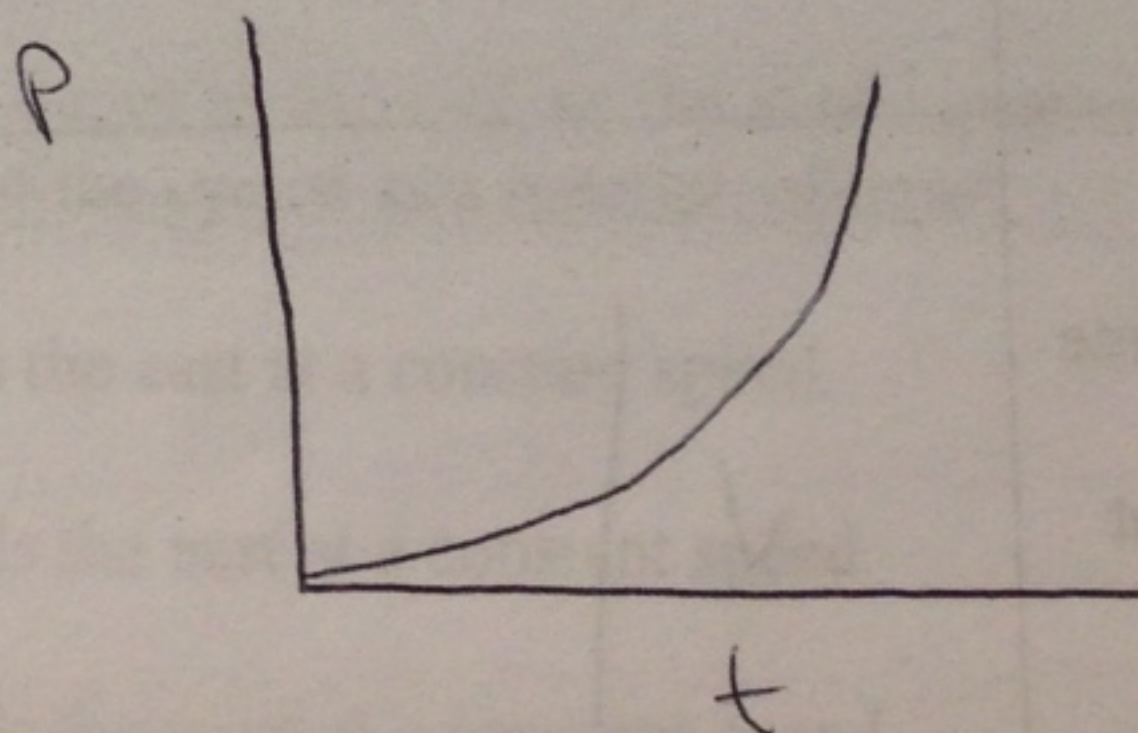
14. Sketch a position-time graph for an object which is moving with a constant, positive velocity.



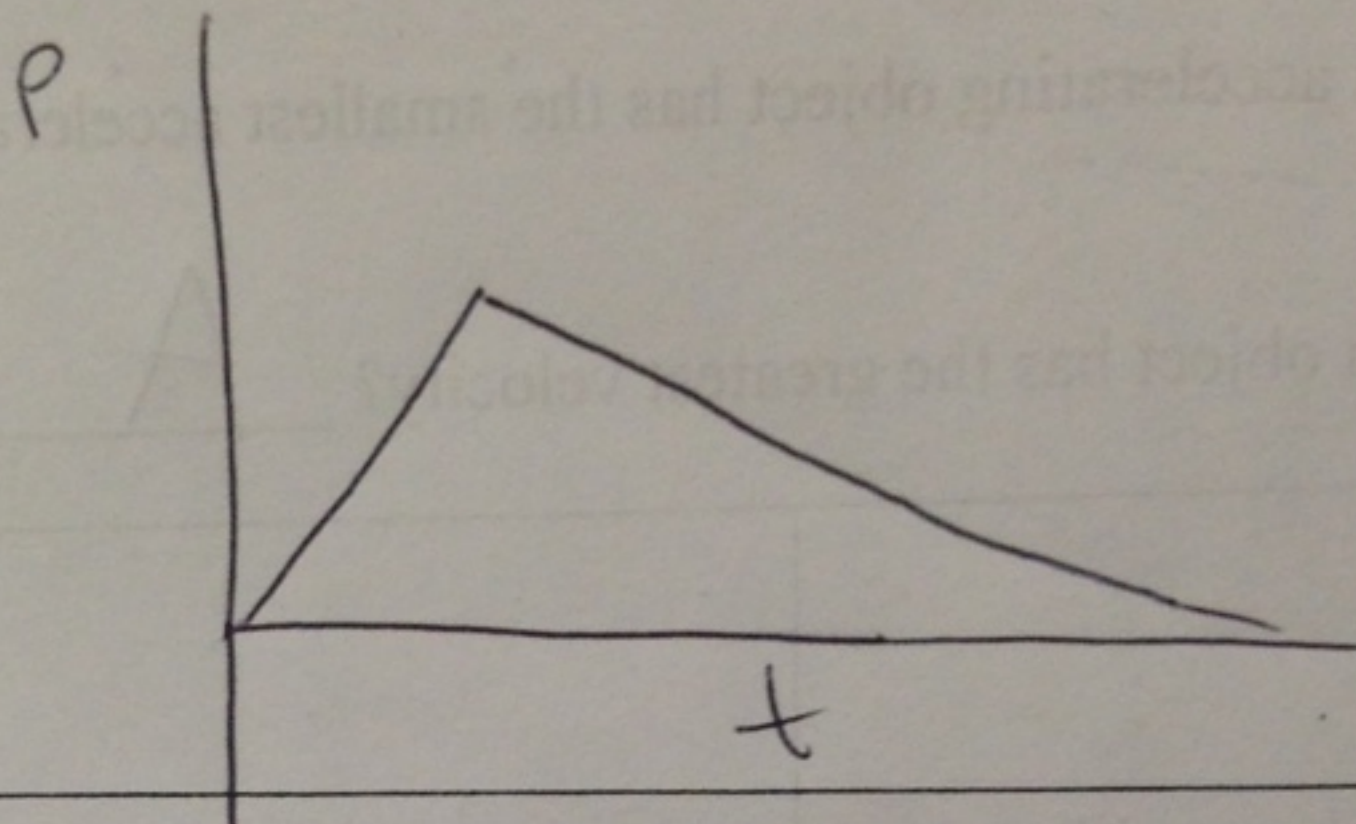
15. Sketch a position-time graph for an object which is moving with a constant, negative velocity



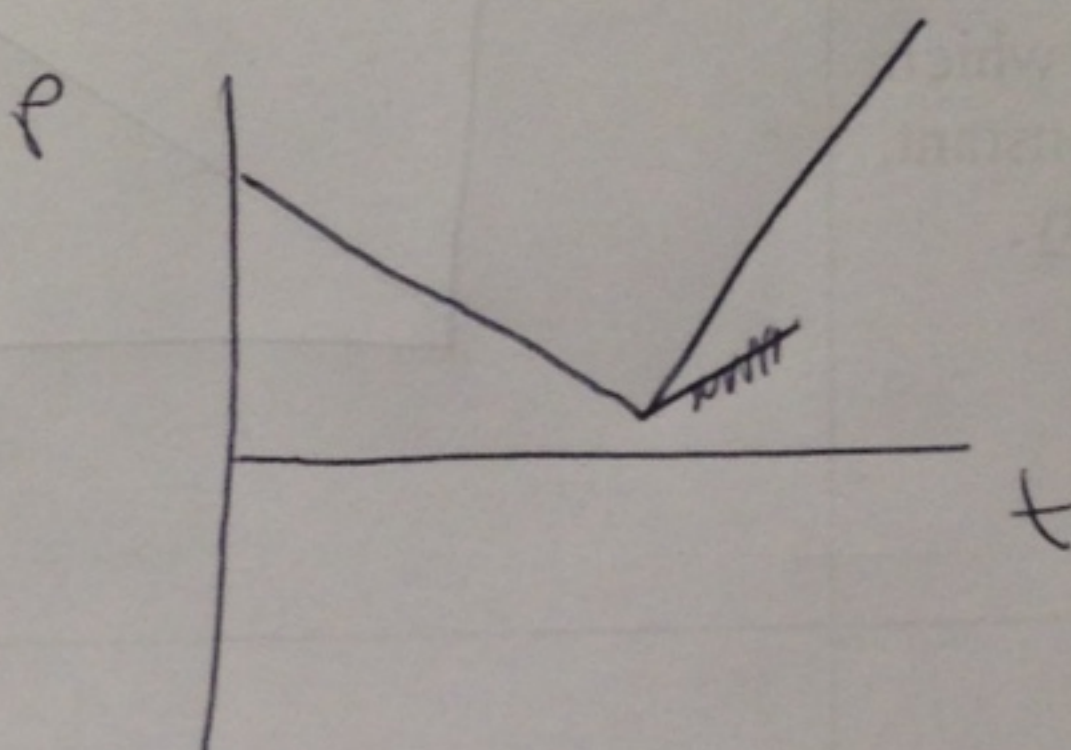
16. Sketch a position-time graph for an object moving in the + dir'n and accelerating from a low velocity to a high velocity



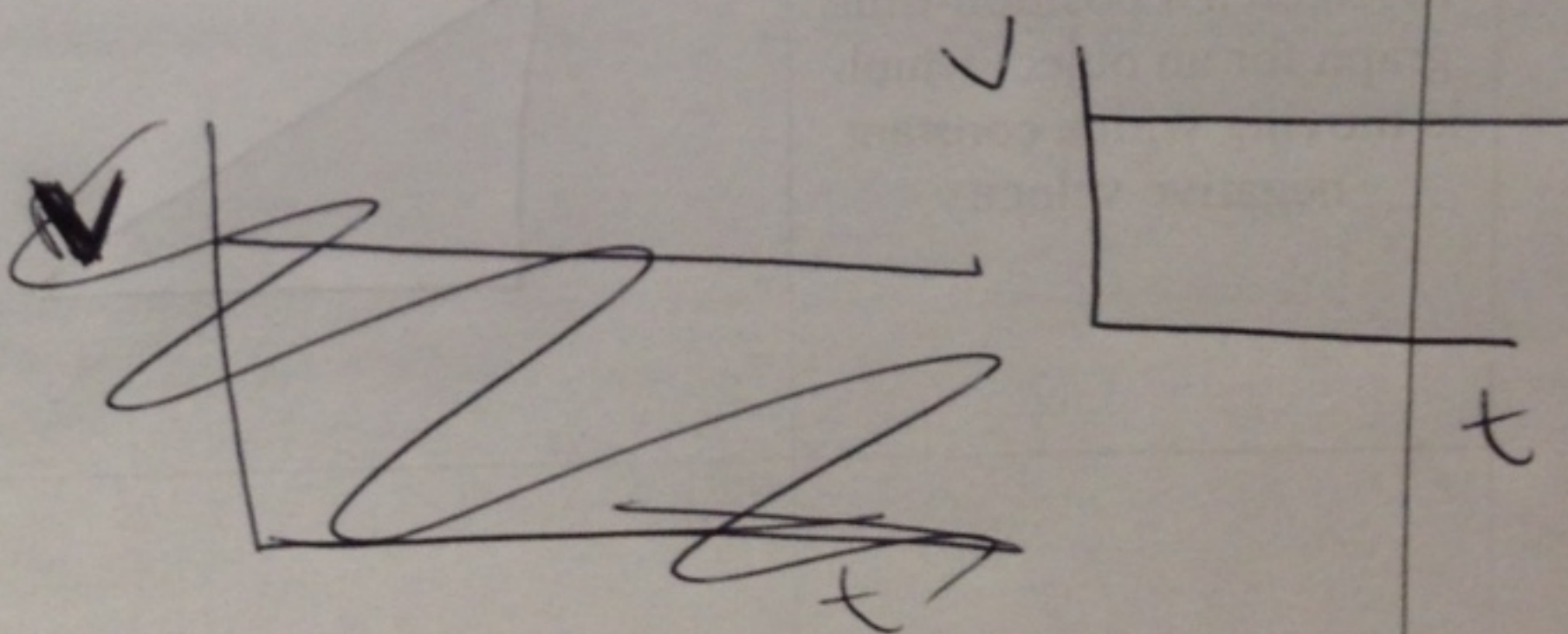
25. Sketch a position-time graph for an object which moves in the + direction at a fast constant speed and then in a - direction at a slow constant speed.



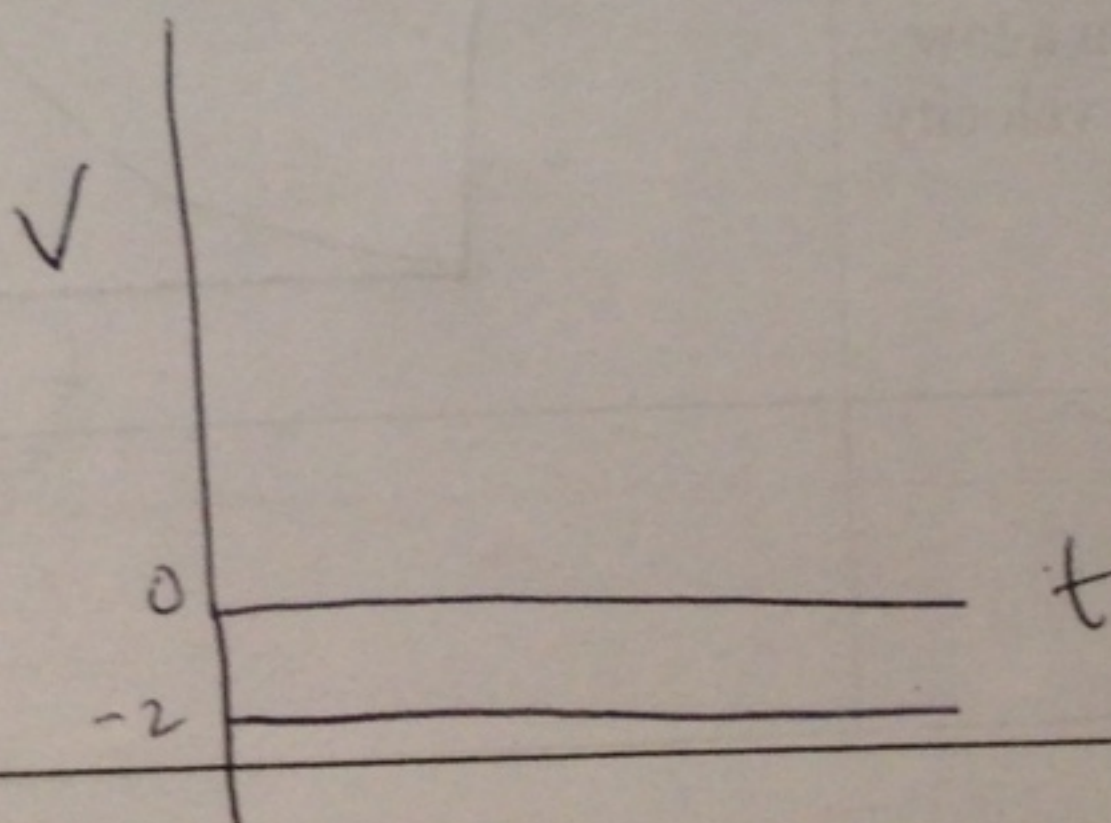
26. Sketch a position-time graph for an object which moves in the - direction at a slow constant speed and then in a + direction at a fast constant speed.



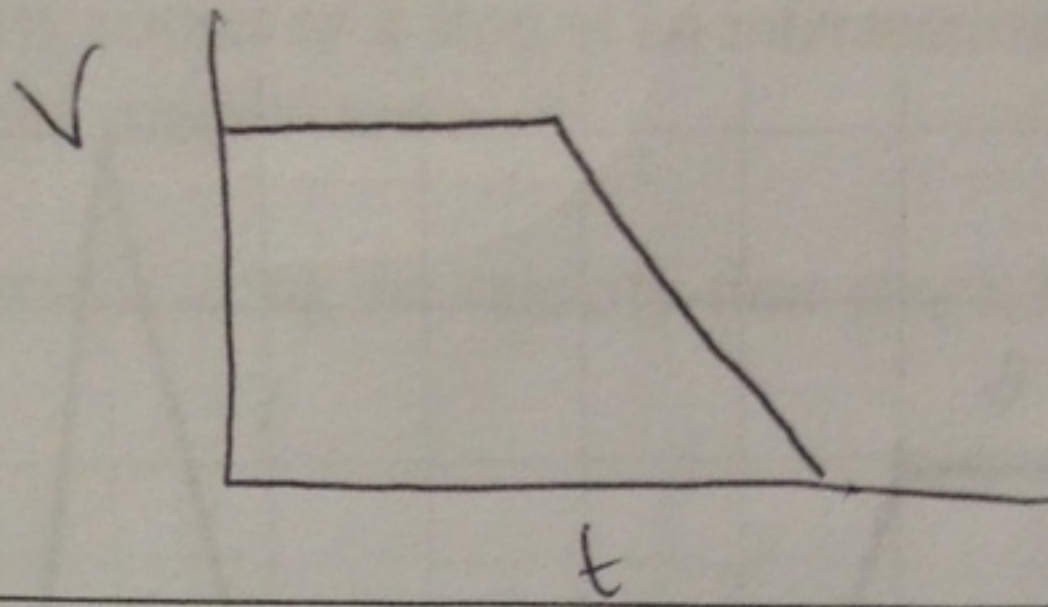
27. Sketch a velocity-time graph for an object moving with a constant speed in the positive direction.



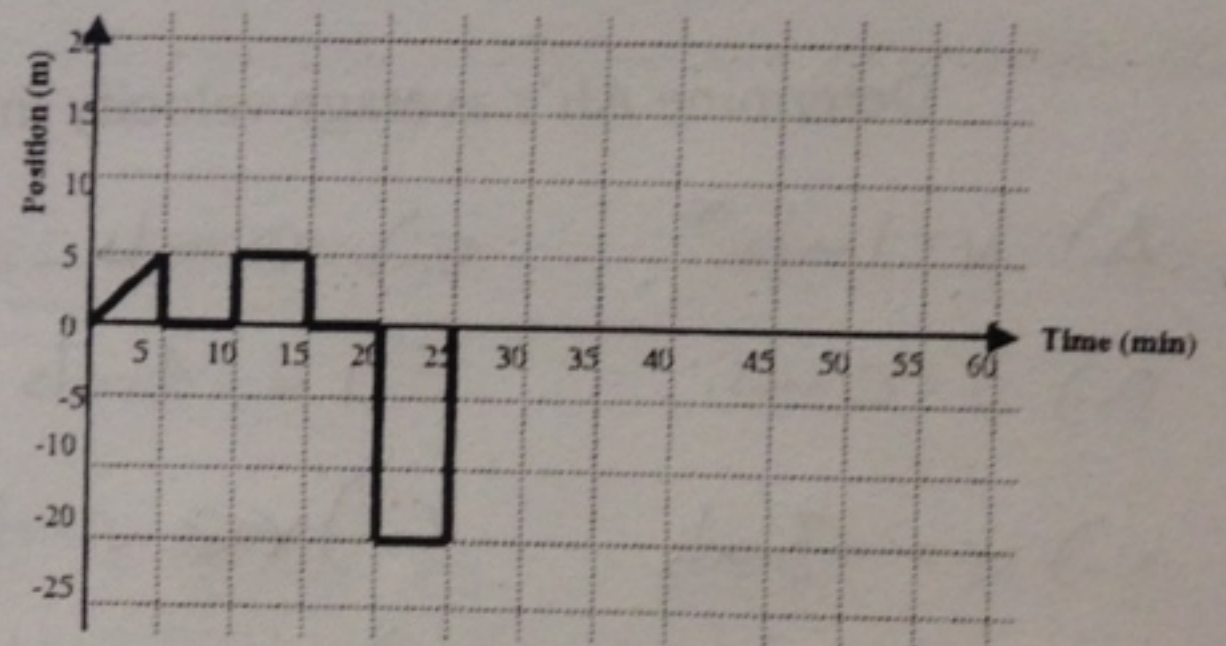
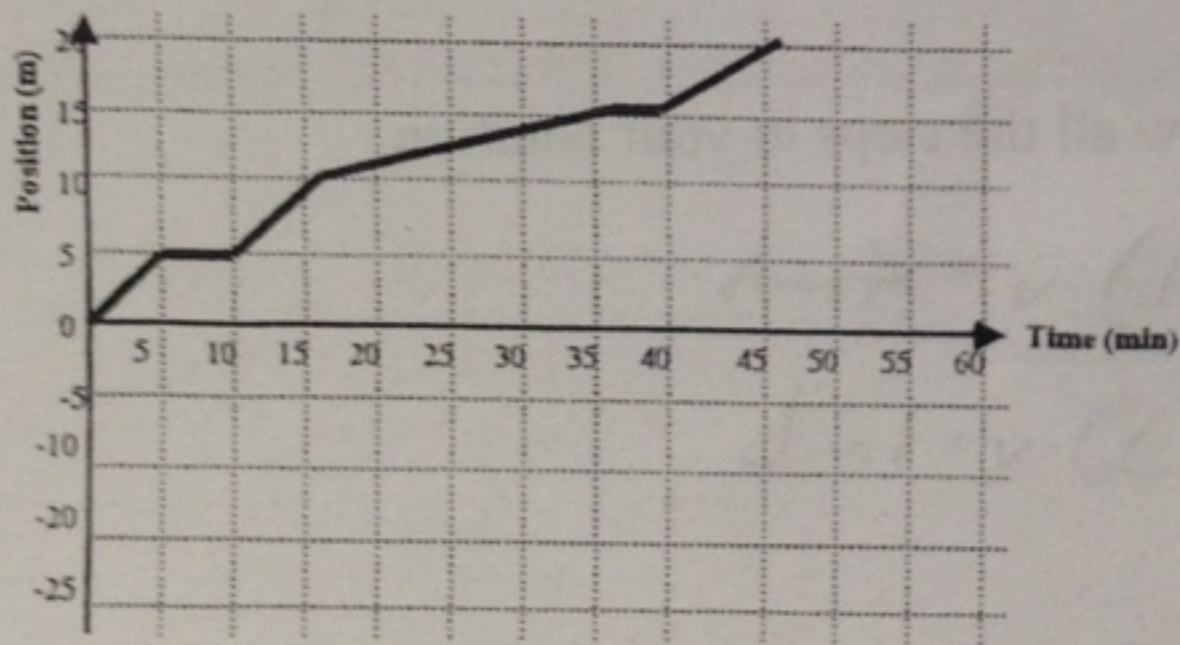
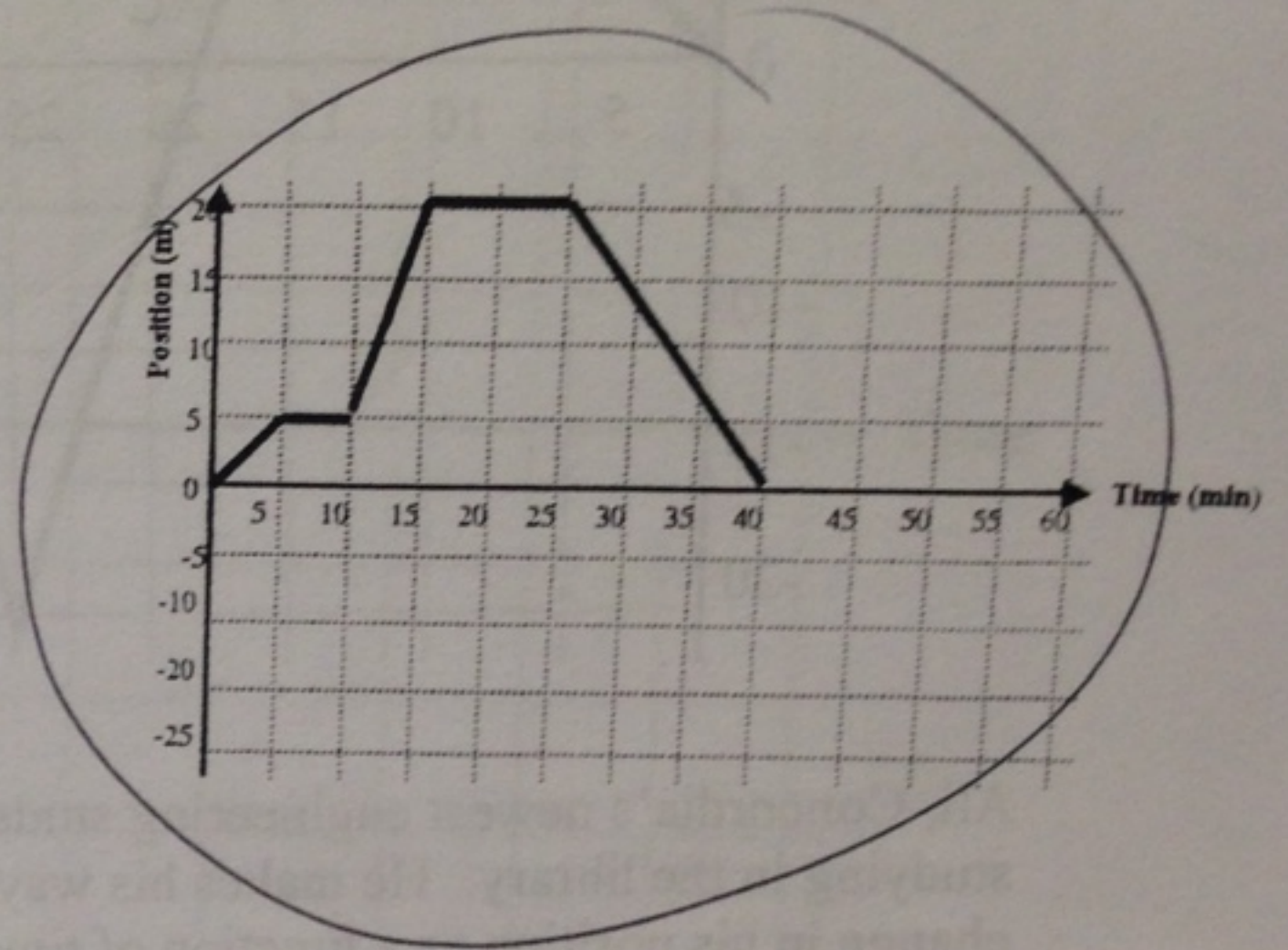
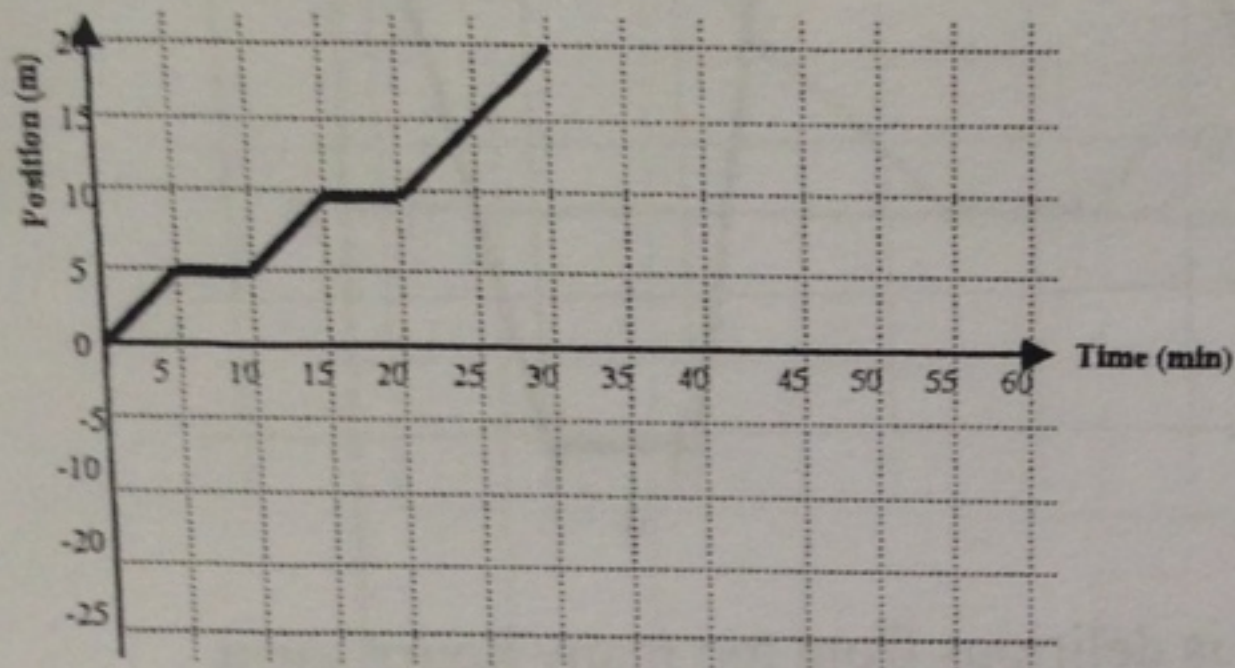
28. Sketch a velocity-time graph for an object moving with a constant speed in the negative direction.



37. Sketch a velocity-time graph for an object which first moves with a constant speed in the + direction, and then moves with a negative acceleration.



Part 6
1.

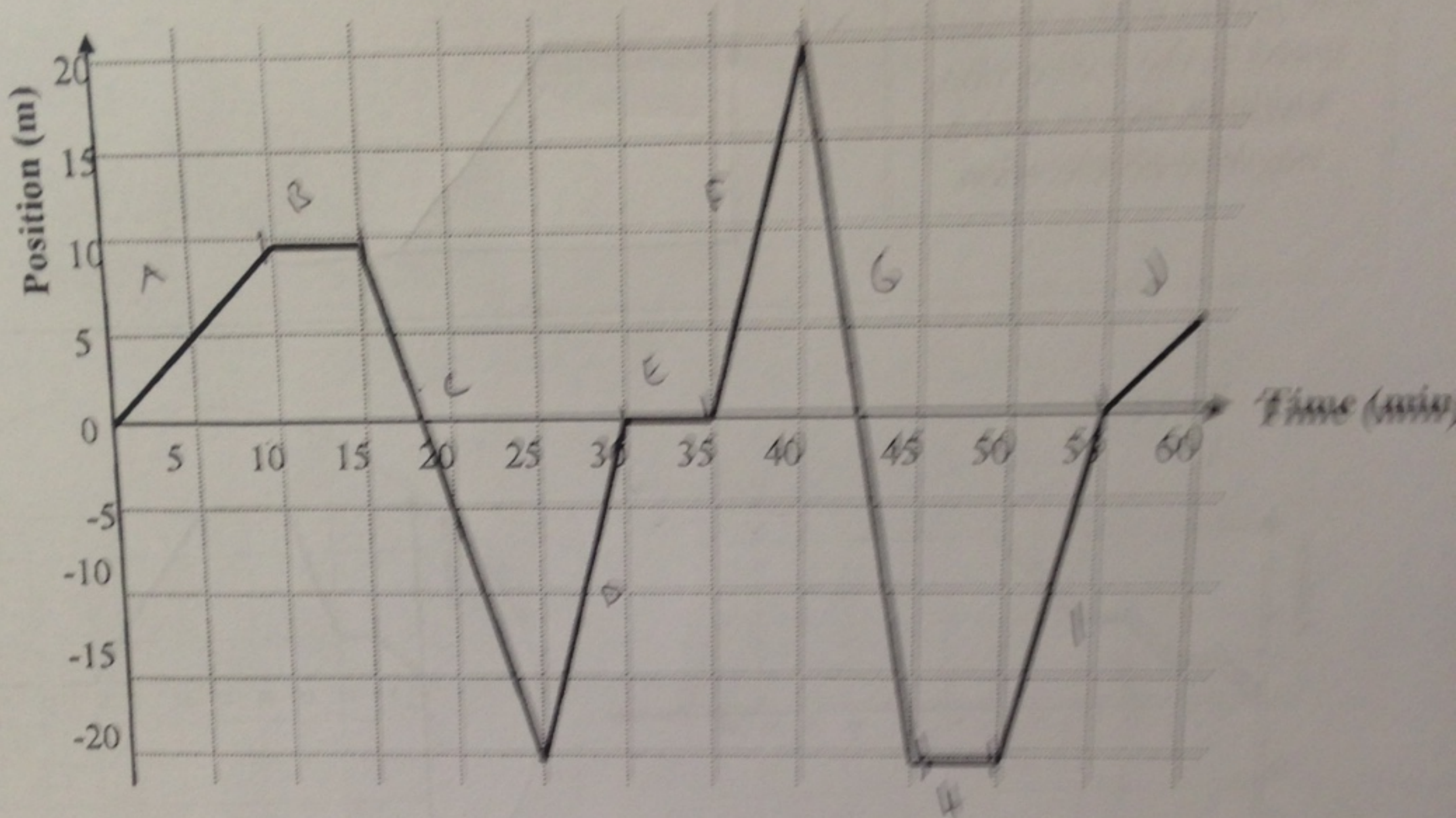


A cyclist's trip is divided into stages as depicted on the above graphs. What graph depicts the following position of the cyclist as a function of time?

1. She travels 5 m towards the east at a constant speed.
2. She rests.
3. She travels 15 m towards the east at a constant speed.
4. She rests.
5. She travels 20 m towards the west at a constant speed.

Circle the appropriate graph.

2.



Ali, Concordia's newest engineering student, is delirious from too many hours spent studying in the library. He makes his way home and the above graph illustrates the change in his position as a function of time.

Determine Ali's average velocity in m/s. Show all the steps in your solution.

A) $v = 1 \text{ m/s}$

E) $v = 0 \text{ m/s}$

I) $v = 4 \text{ m/s}$

B) $v = 0 \text{ m/s}$

F) $v = 4 \text{ m/s}$

J) $v = 1 \text{ m/s}$

C) $v = -3 \text{ m/s}$

G) $v = -8 \text{ m/s}$

D) $v = 4 \text{ m/s}$

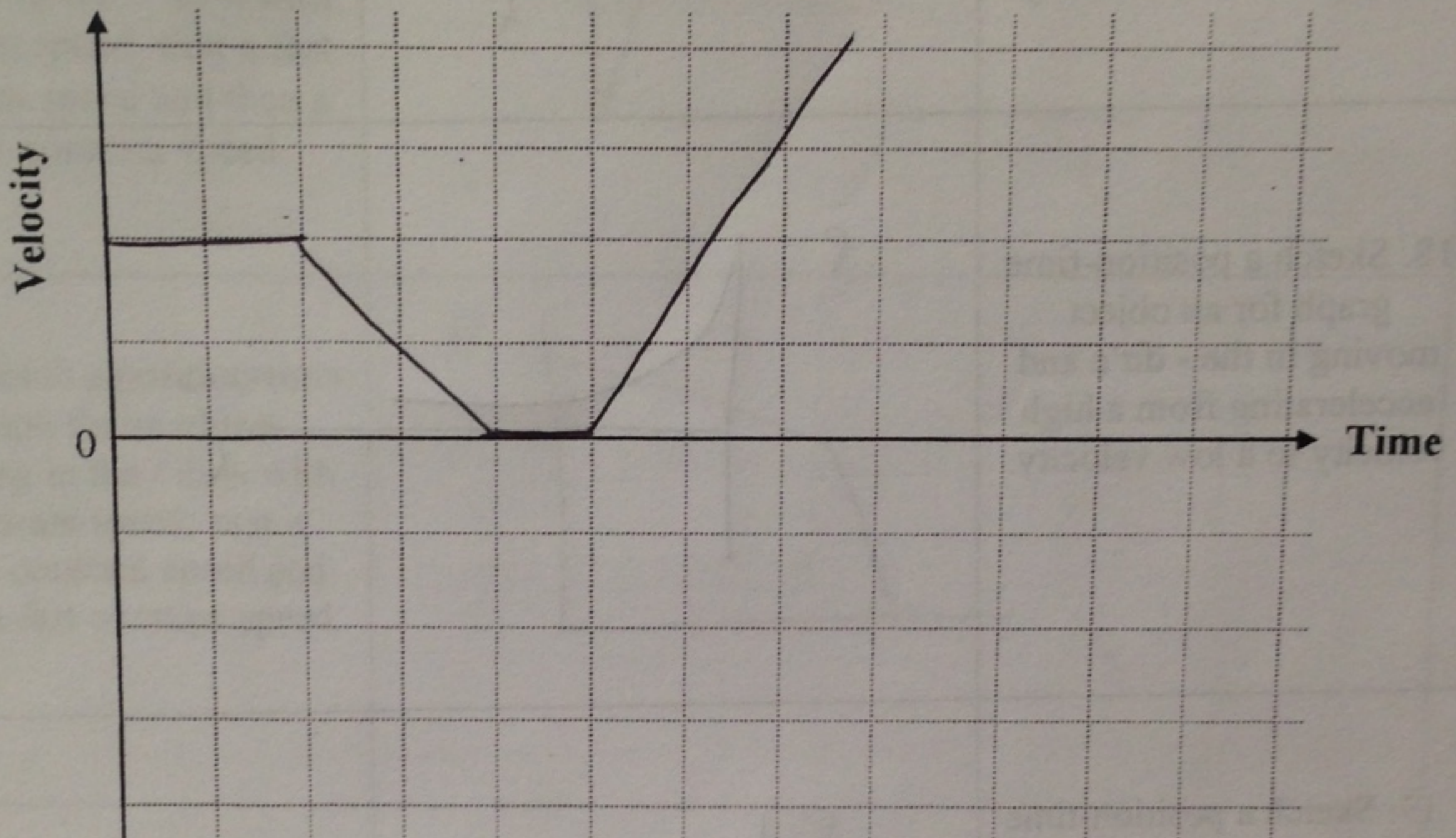
H) $v = 0 \text{ m/s}$

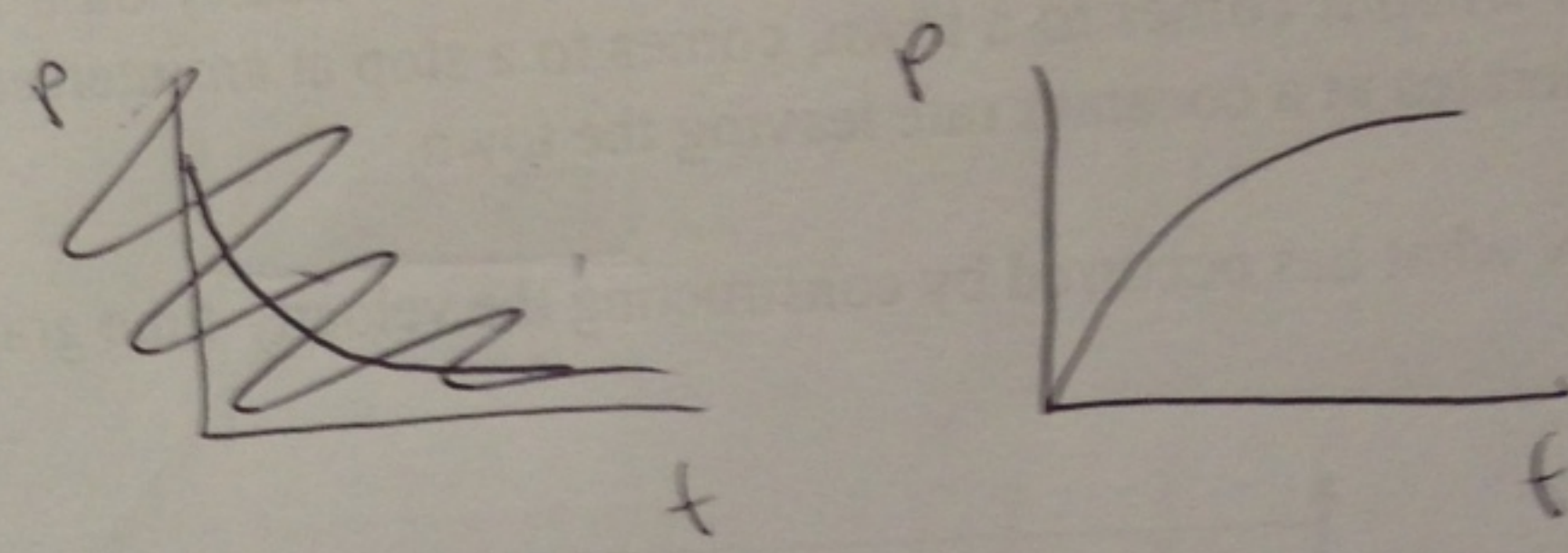
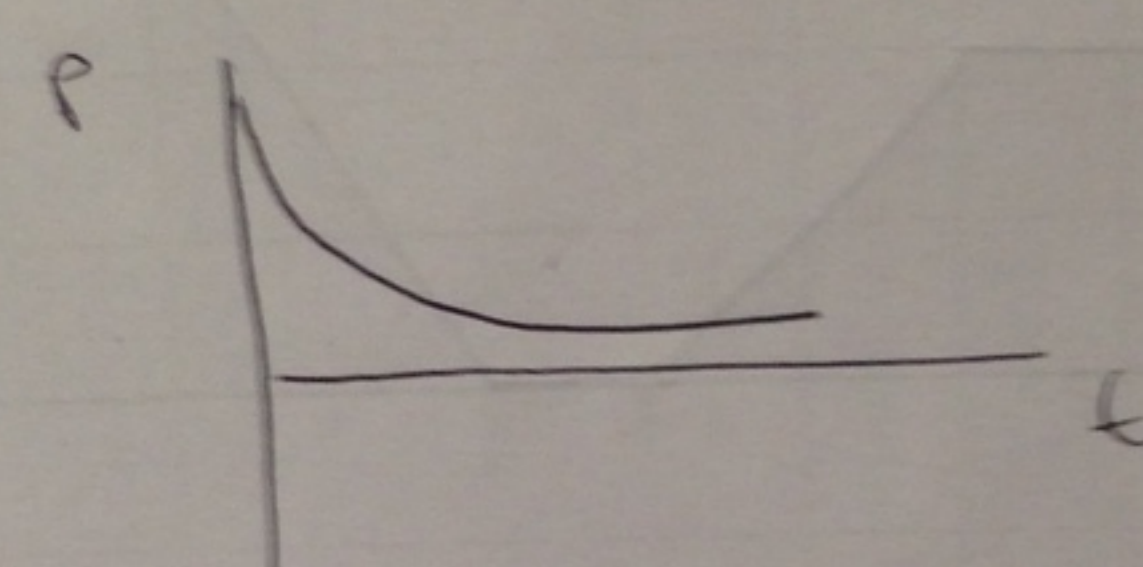
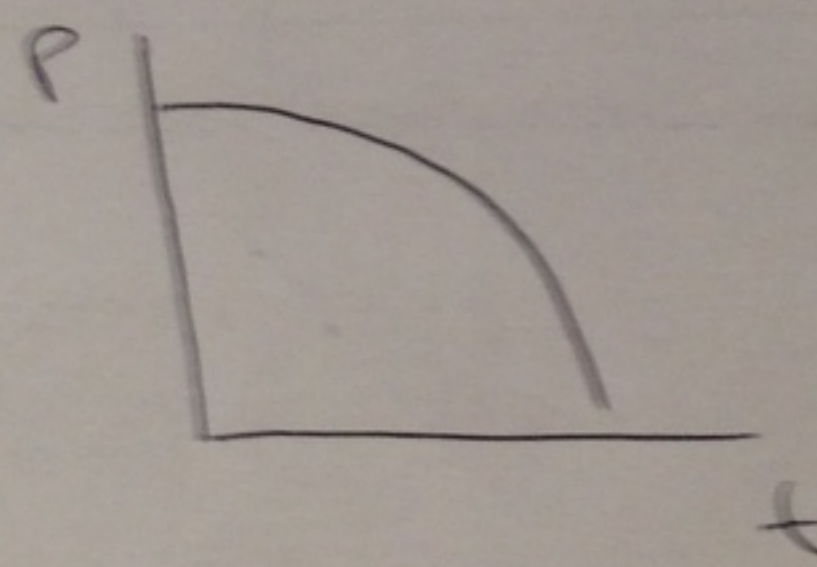
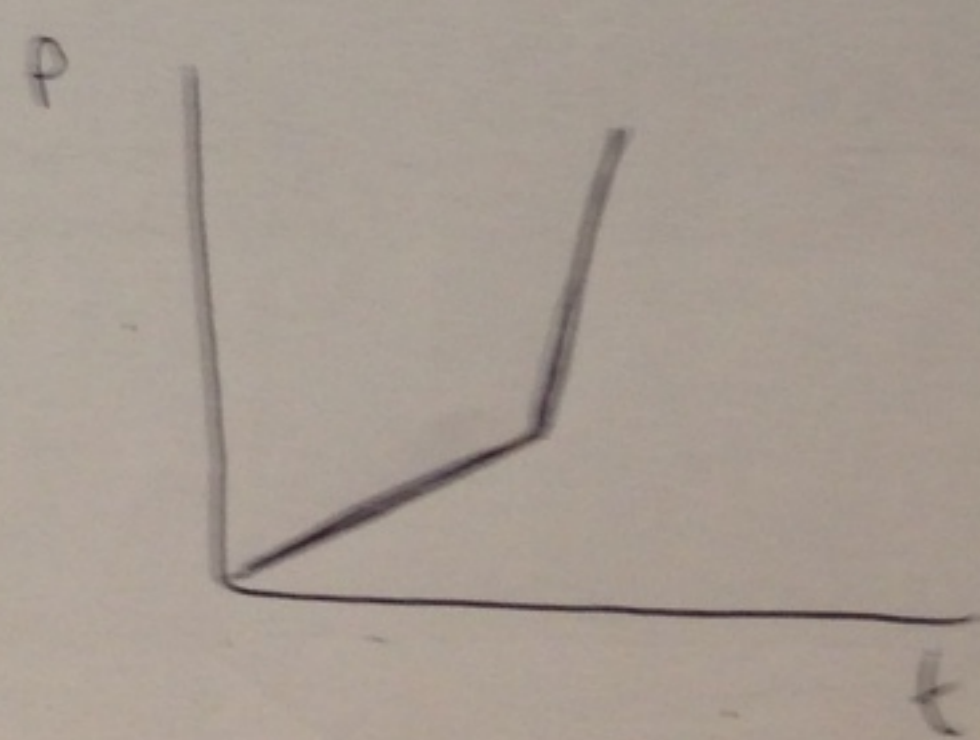
Avg $v = \frac{3}{10}$

$v = 0.3 \text{ m/s}$

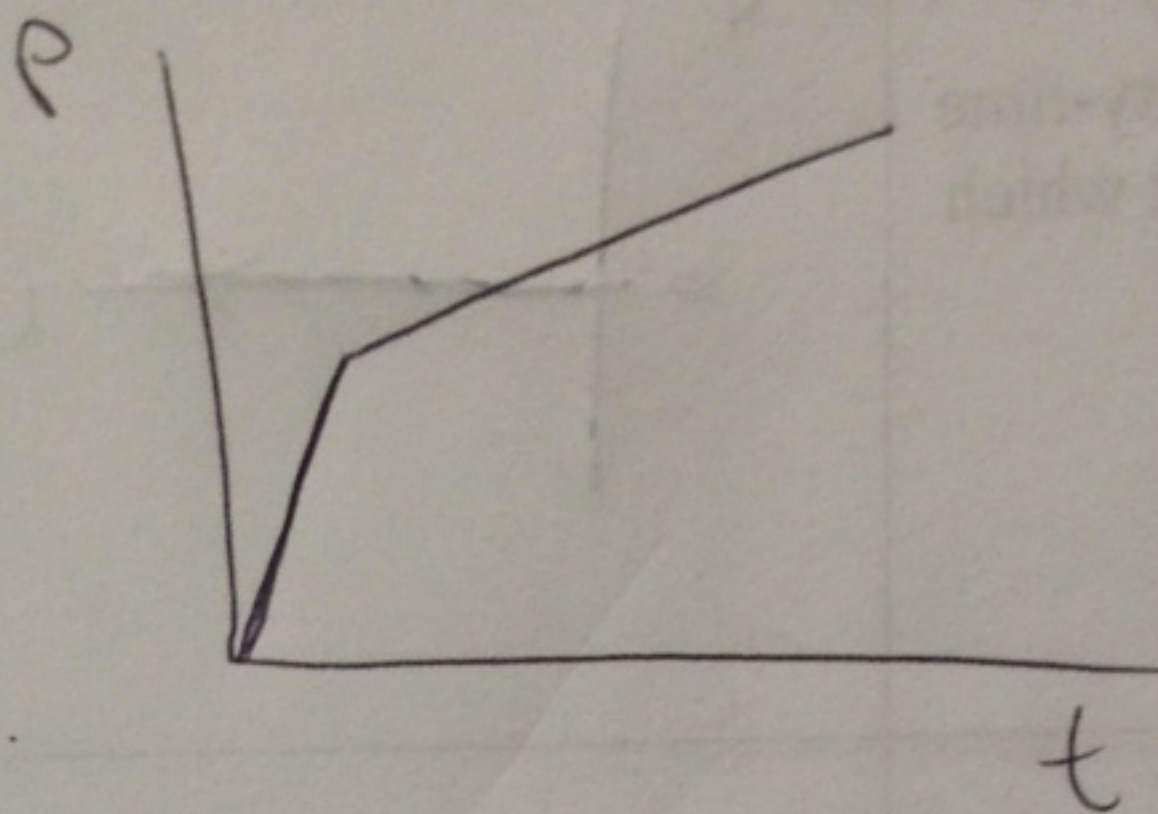
3. An automobile is being driven at constant velocity on a straight road. The car slows down when it comes to a town, comes to a stop at an intersection, then sets off again and accelerates at a constant rate leaving the town.

Show what has occurred by constructing the velocity-time graph for the automobile.

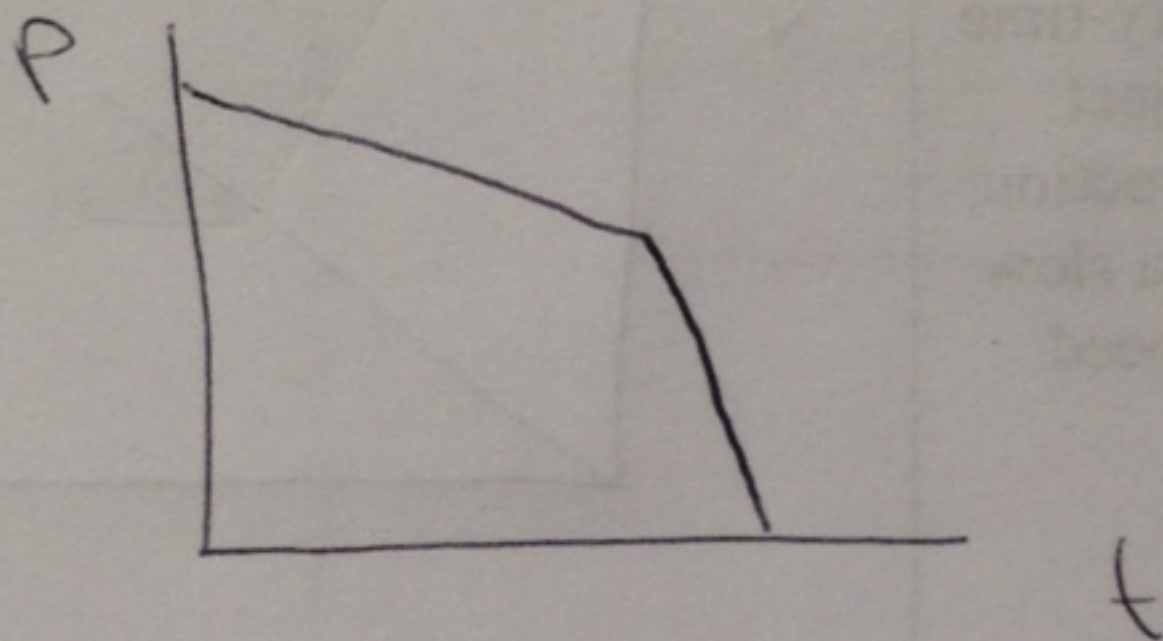


<p>17. Sketch a position-time graph for an object moving in the + dir'n and accelerating from a high velocity to a low velocity.</p>	
<p>18. Sketch a position-time graph for an object moving in the - dir'n and accelerating from a high velocity to a low velocity.</p>	
<p>19. Sketch a position-time graph for an object moving in the - dir'n and accelerating from a low velocity to a high velocity.</p>	
<p>20. Sketch a position-time graph for an object moving in the + dir'n with constant speed; first a slow constant speed and then a fast constant speed.</p>	

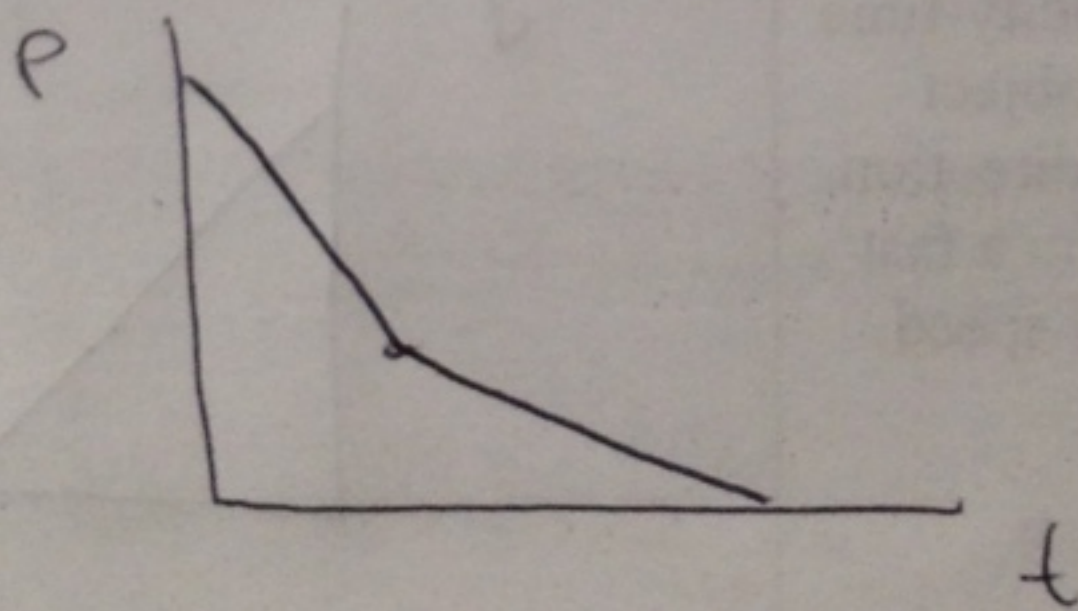
21. Sketch a position-time graph for an object moving in the + dir'n with constant speed; first a fast constant speed and then a slow constant speed.



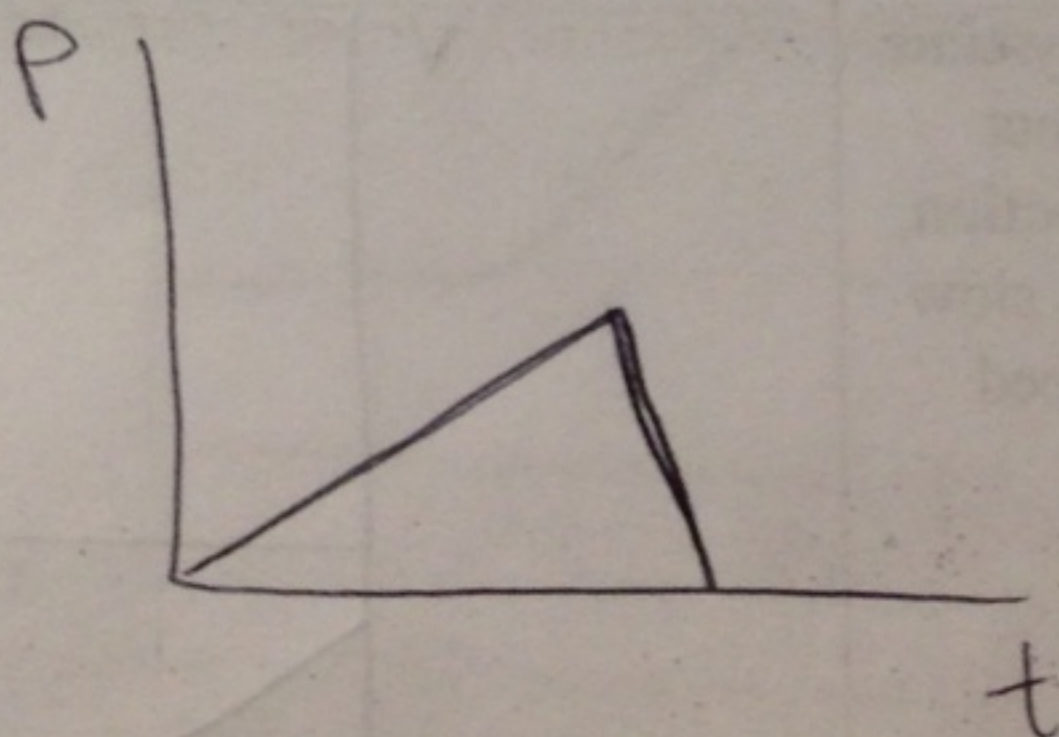
22. Sketch a position-time graph for an object moving in the - dir'n with constant speed; first a slow constant speed and then a fast constant speed.

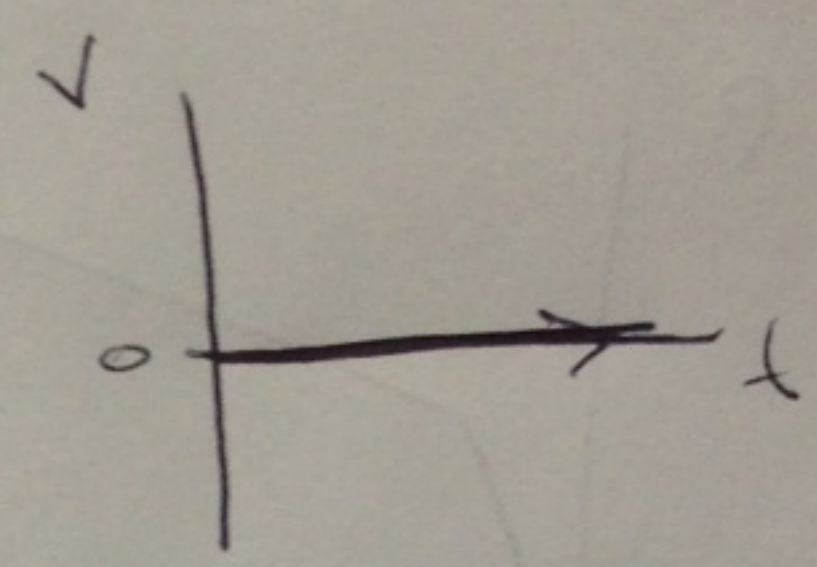
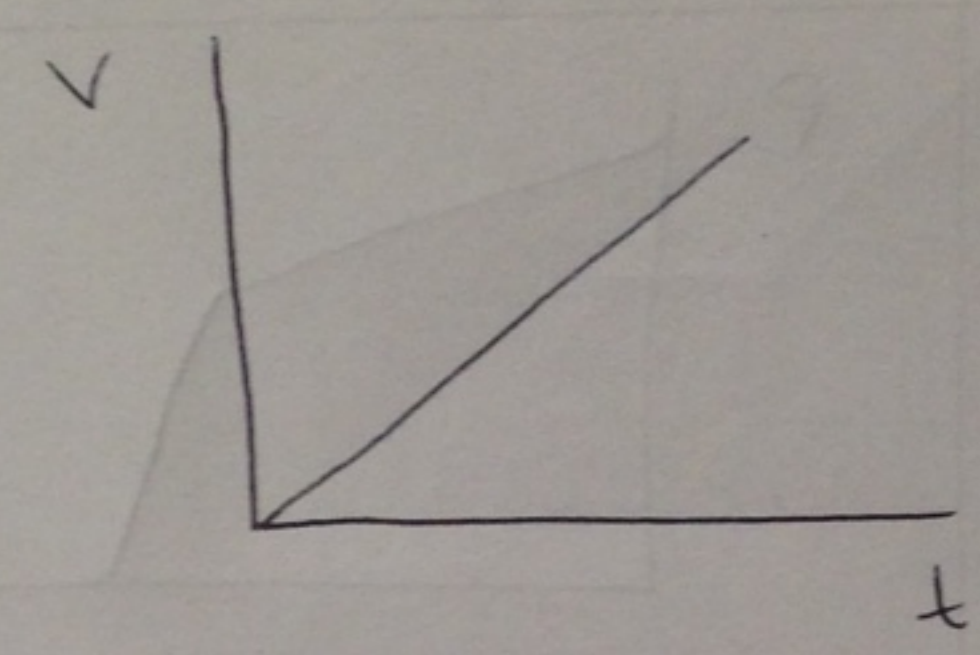
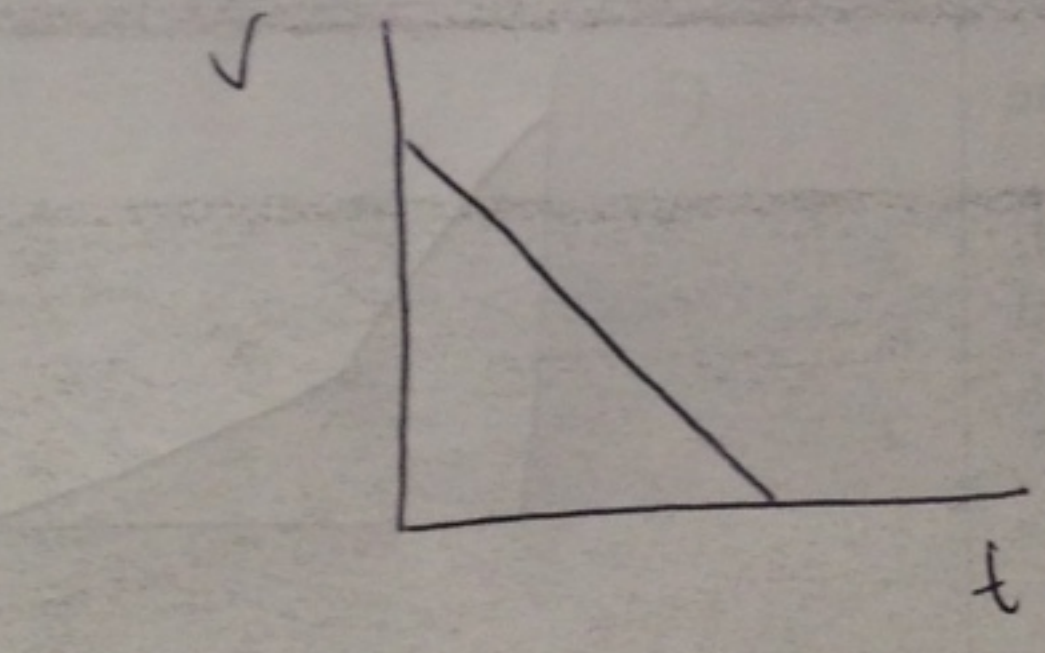
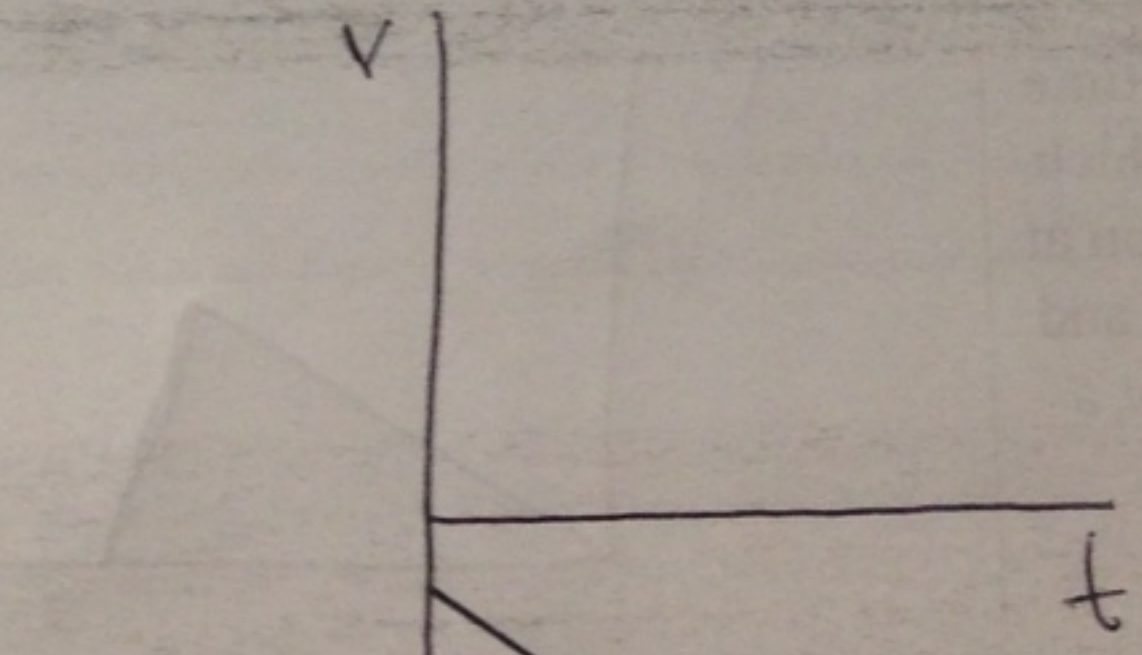


23. Sketch a position-time graph for an object moving in the - dir'n with constant speed; first a fast constant speed and then a slow constant speed.

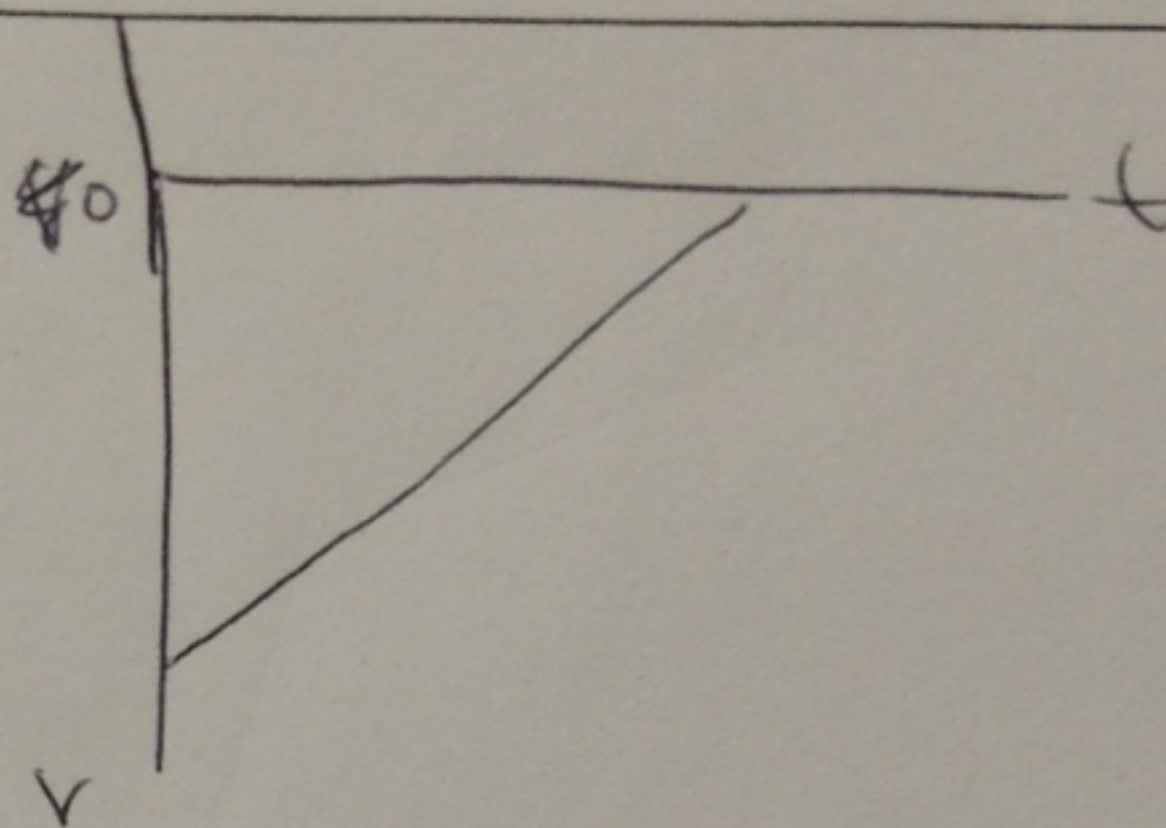


24. Sketch a position-time graph for an object which moves in the + direction at a slow constant speed and then in a - direction at a fast constant speed.

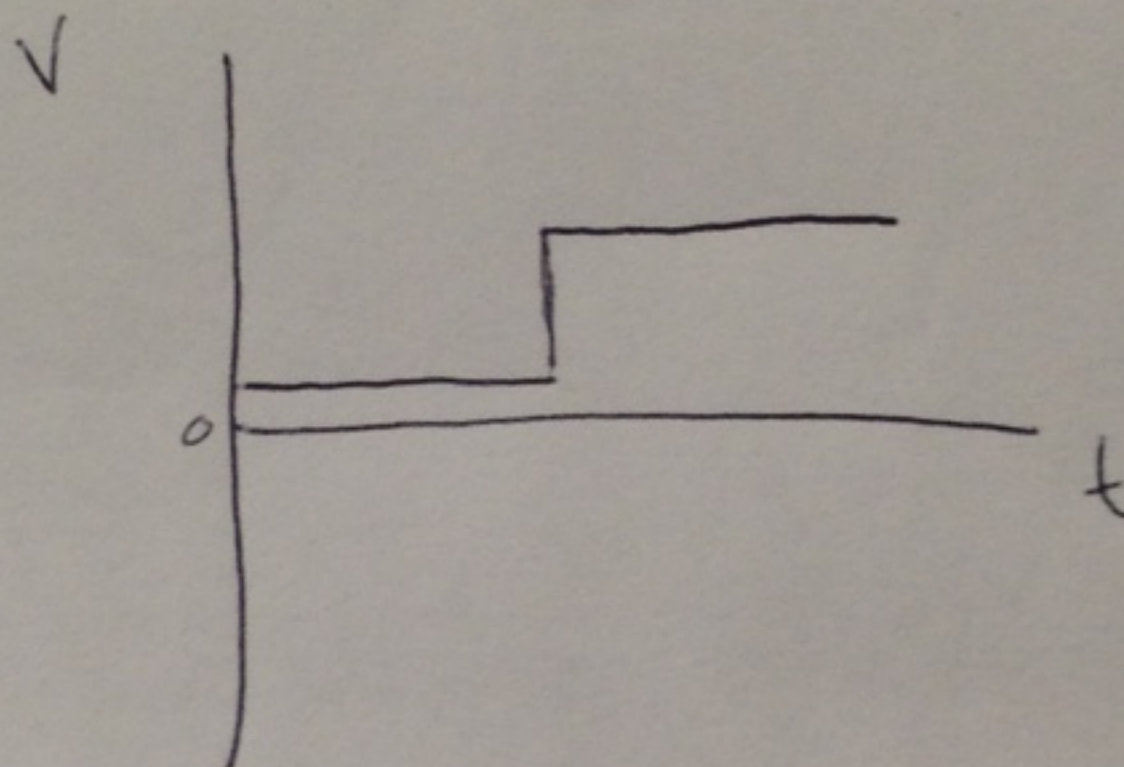


<p>29. Sketch a velocity-time graph for an object which is at rest.</p>	
<p>30. Sketch a velocity-time graph for an object moving in the + direction, accelerating from a slow speed to a fast speed.</p>	
<p>31. Sketch a velocity-time graph for an object moving in the + direction, accelerating from a fast speed to a slow speed.</p>	
<p>32. Sketch a velocity-time graph for an object moving in the - direction, accelerating from a slow speed to a fast speed.</p>	

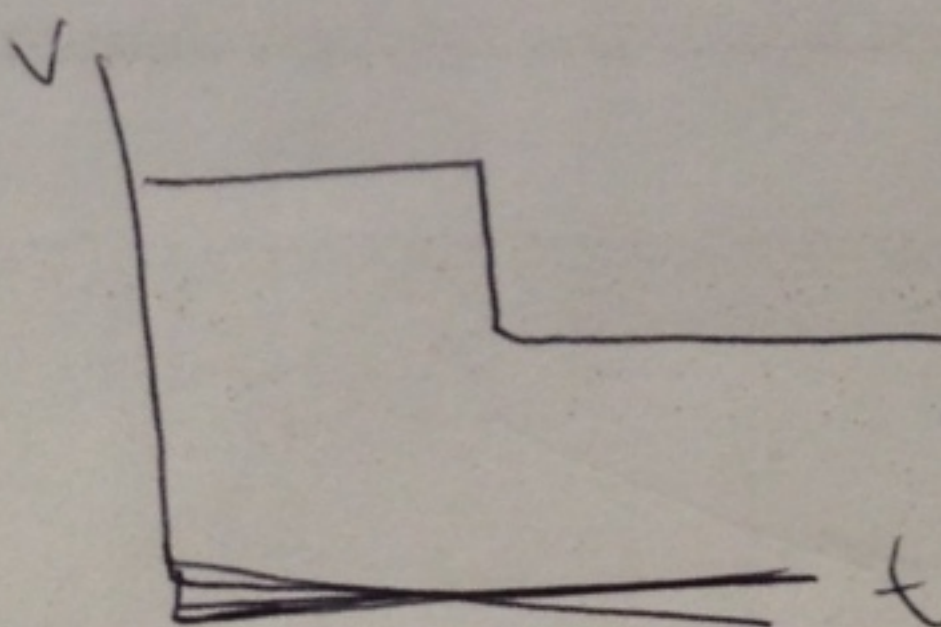
33. Sketch a velocity-time graph for an object moving in the - direction, accelerating from a fast speed to a slow speed.



34. Sketch a velocity-time graph for an object which first moves with a slow, constant speed in the + direction, and then with a fast constant speed in the + direction.



35. Sketch a velocity-time graph for an object which first moves with a fast, constant speed in the + direction, and then with a slow constant speed in the + direction.



36. Sketch a velocity-time graph for an object which first moves with a constant speed in the + direction, and then moves with a positive acceleration.

