$$\text{AVERAGE VELOCITY} = \frac{\text{change in position}}{\text{elapsed time}}$$

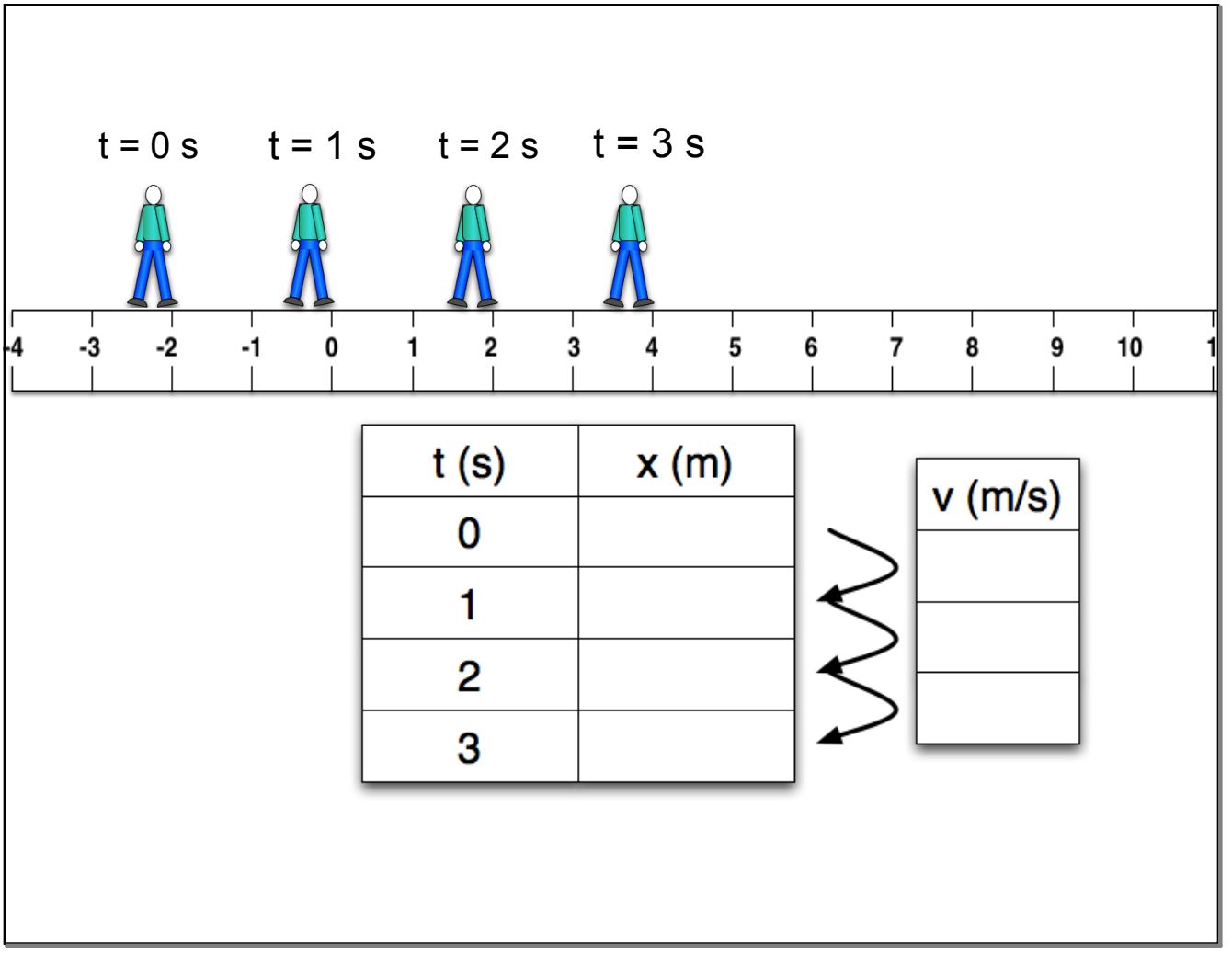
Change in position is final position minus initial position.

The sign of the answer indicates direction.

It's a vector - it tells you something about where you ended up.

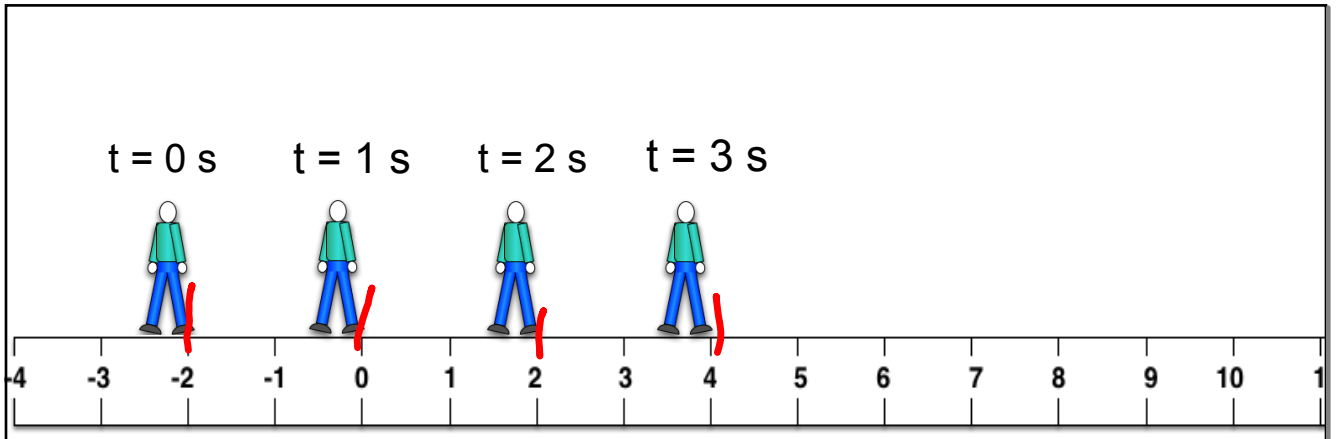
The smaller you can make the time jumps, the more accurately you know the velocities during the motion. (You wouldn't miss things like turn-arounds and accelerations.)

Instantaneous velocity = the ideal limit when the time jumps are infinitesimally small. You would know the velocity at every moment in time.



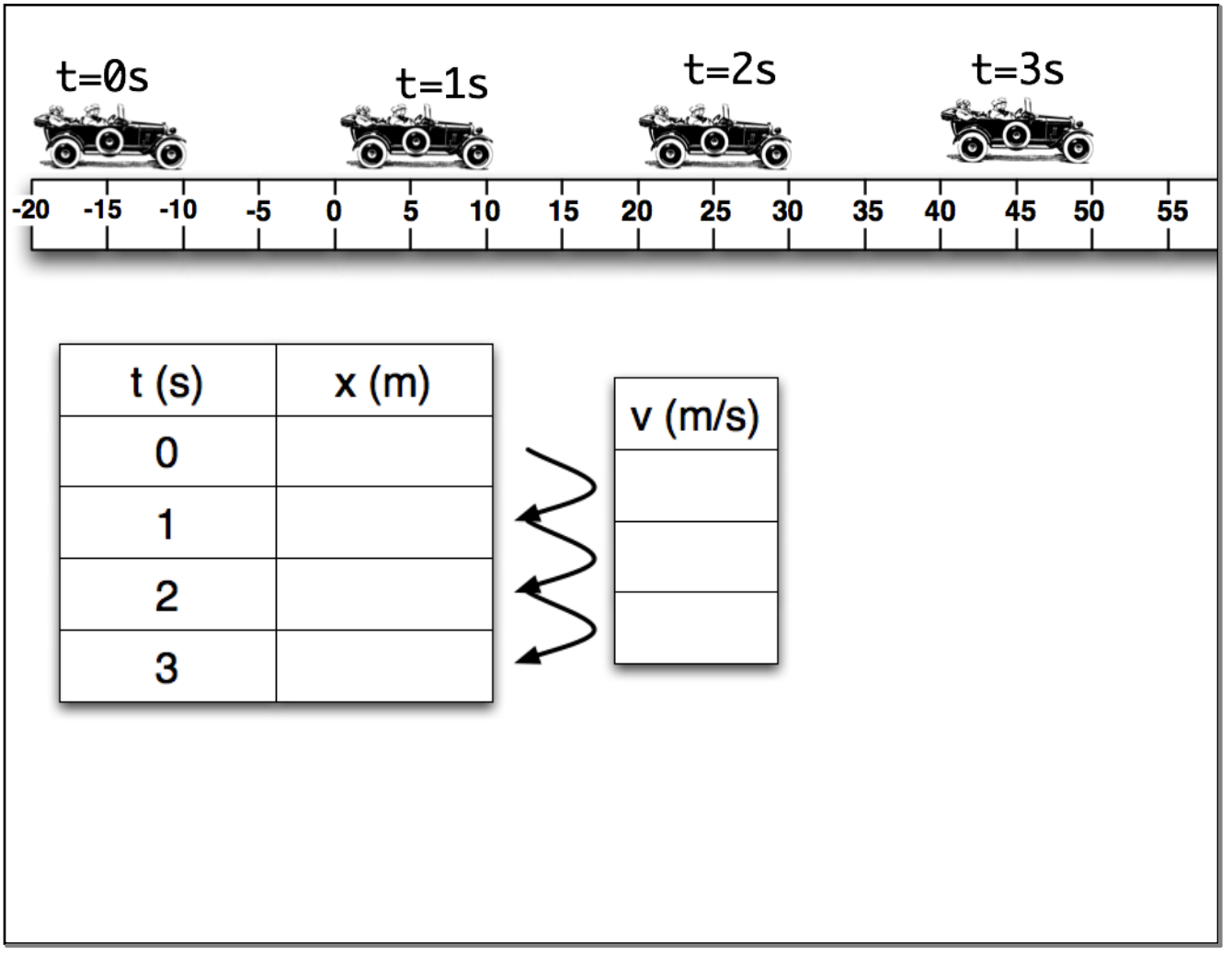
t (s)	x (m)
0	
1	
2	
3	

v (m/s)



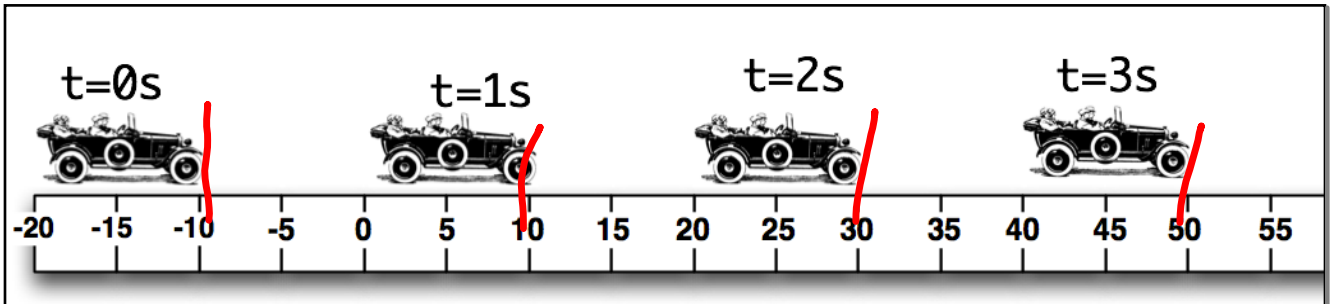
t (s)	x (m)
0	-2
1	0
2	2
3	4

v (m/s)
2 m/s
2 m/s
2 m/s



t (s)	x (m)
0	
1	
2	
3	

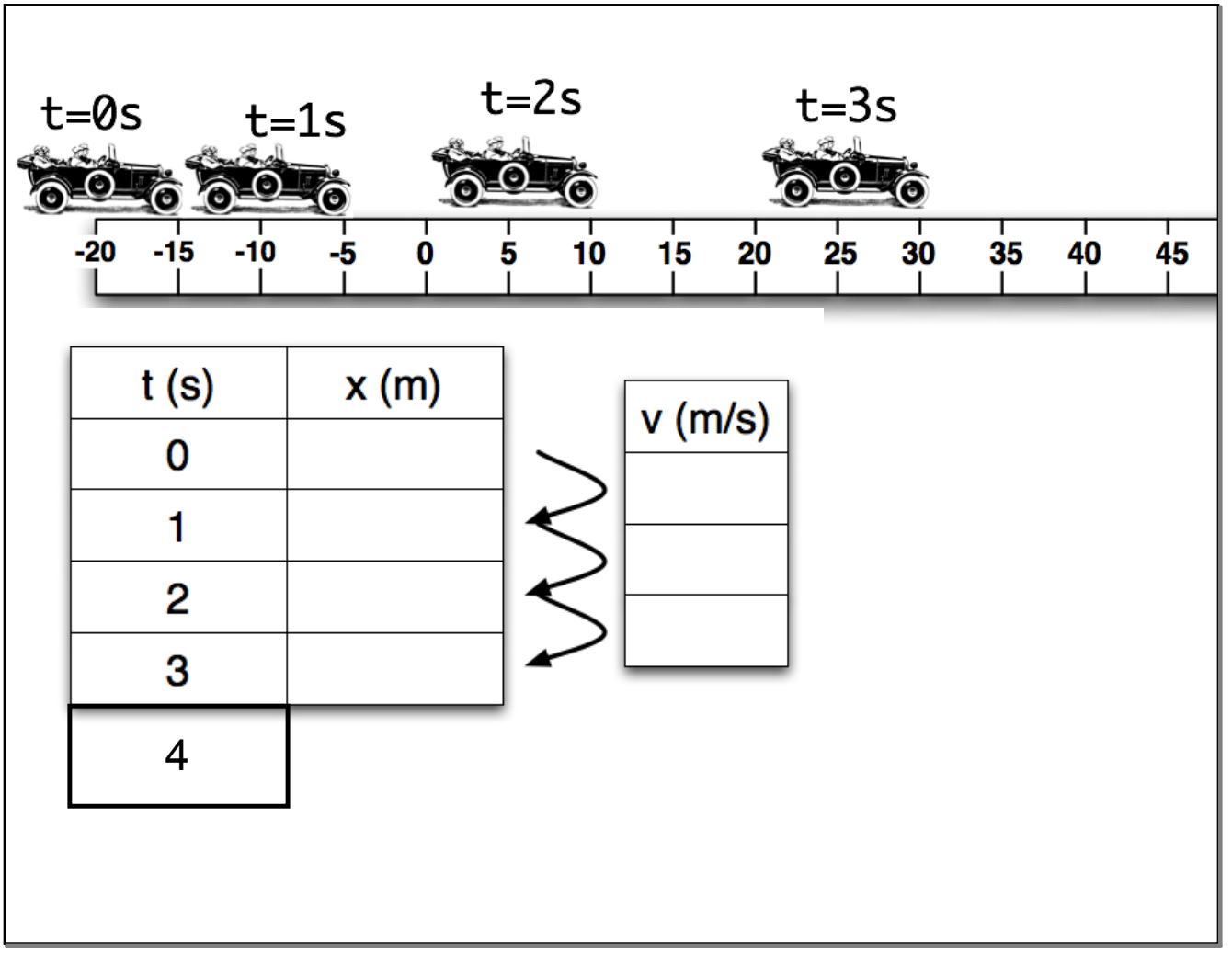
v (m/s)



t (s)	x (m)
0	−10
1	10
2	30
3	50

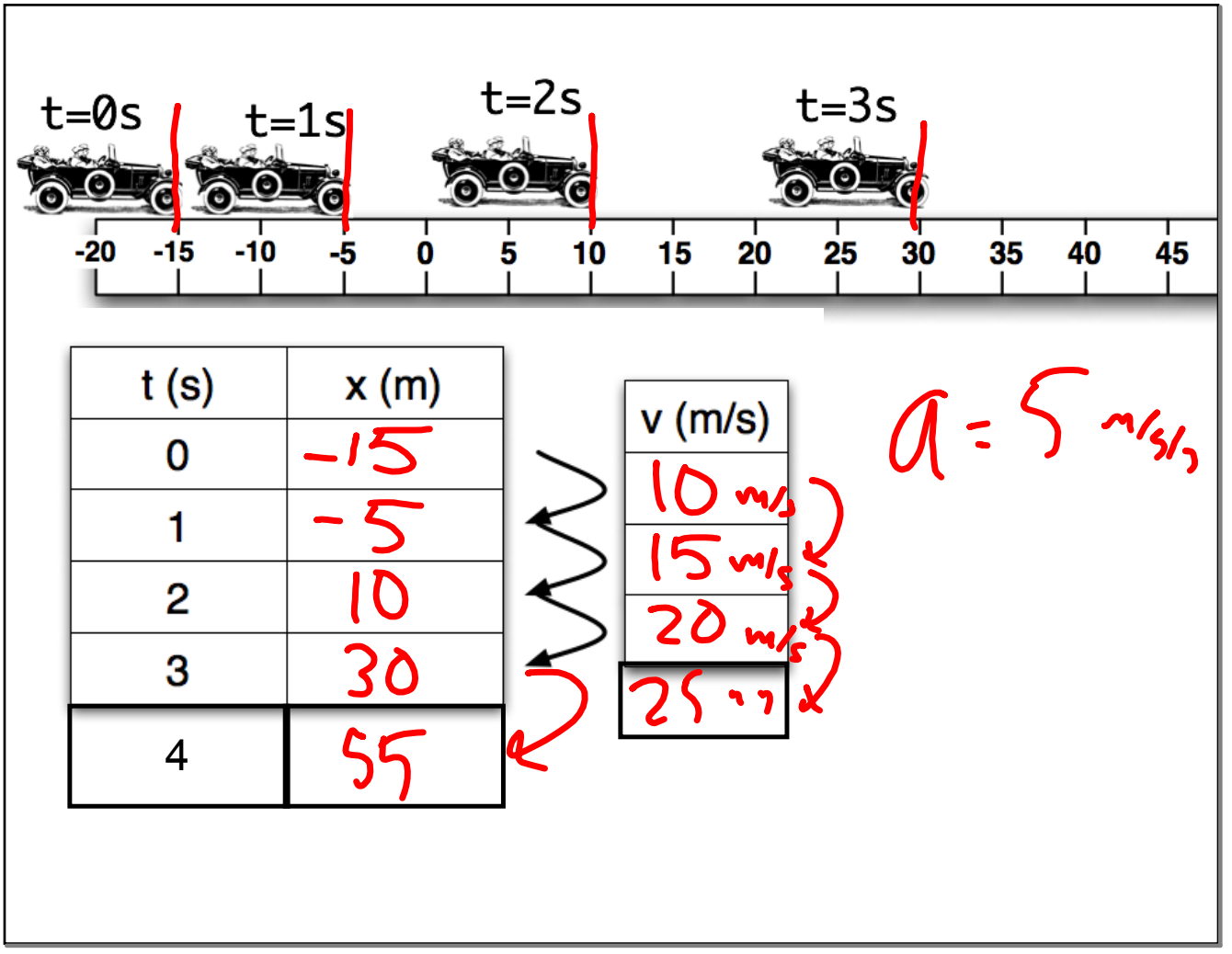
v (m/s)
20 m/s
20 m/s
20 m/s

a = 0



t (s)	x (m)
0	
1	
2	
3	
4	

v (m/s)



t (s)	x (m)
0	-15
1	-5
2	10
3	30
4	55

v (m/s)
10 m/s
15 m/s
20 m/s
25 m/s

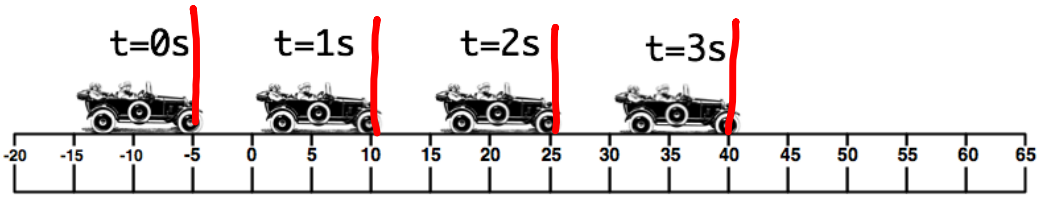
$a = 5\ m/s/s$

When something is constant...

then the instantaneous value at any moment is the same as average value.

$$\text{AVERAGE ACCELERATION} = \frac{\text{change in velocity}}{\text{elapsed time}}$$

Check yourself on #1



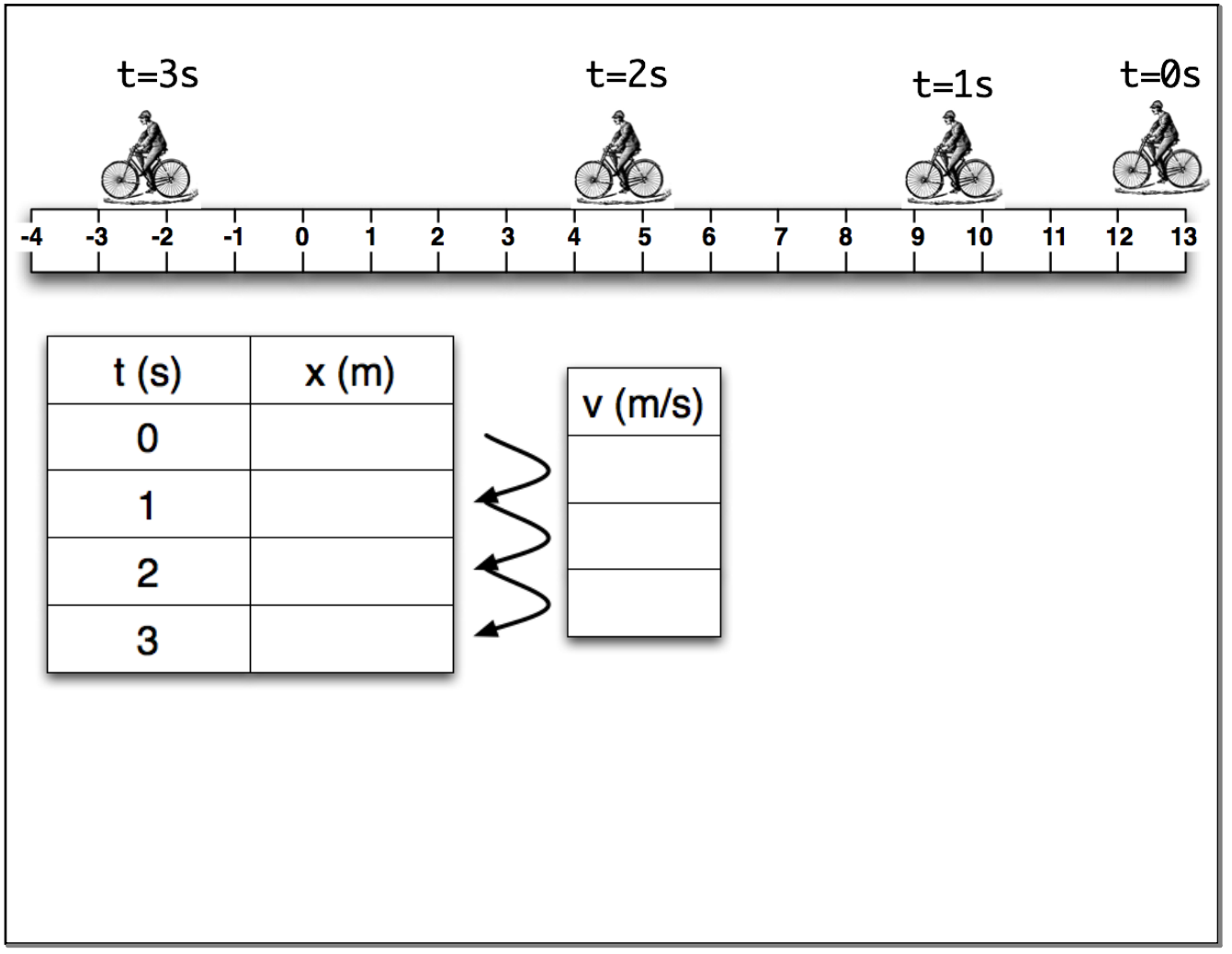
Describe the motion. What was the acceleration?

Constant

accel = 0

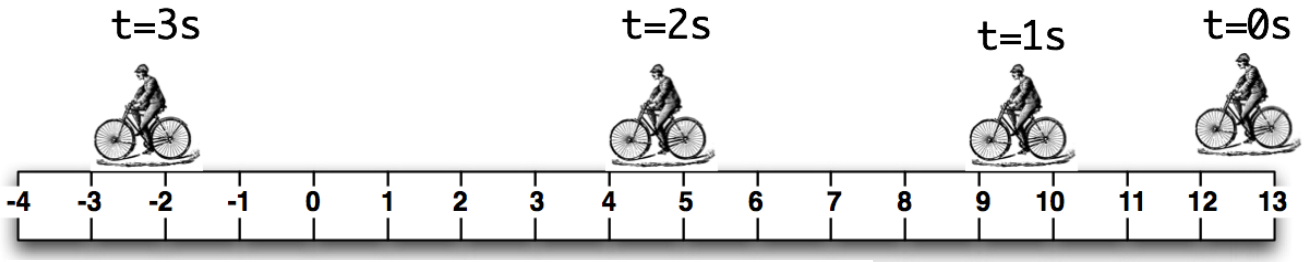
t (s)	x (m)
0	-5
1	10
2	25
3	40
4	55

v (m/s)
15 m/s
15 m/s
15 m/s
15 m/s



t (s)	x (m)
0	
1	
2	
3	

v (m/s)



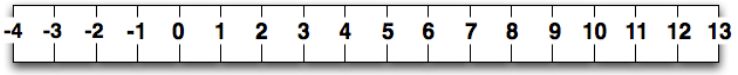
t (s)	x (m)
0	12 m
1	9 m
2	4 m
3	-3 m

v (m/s)
-3 m/s
-5 m/s
-7 m/s

a = -2 m/s/s

speed up!

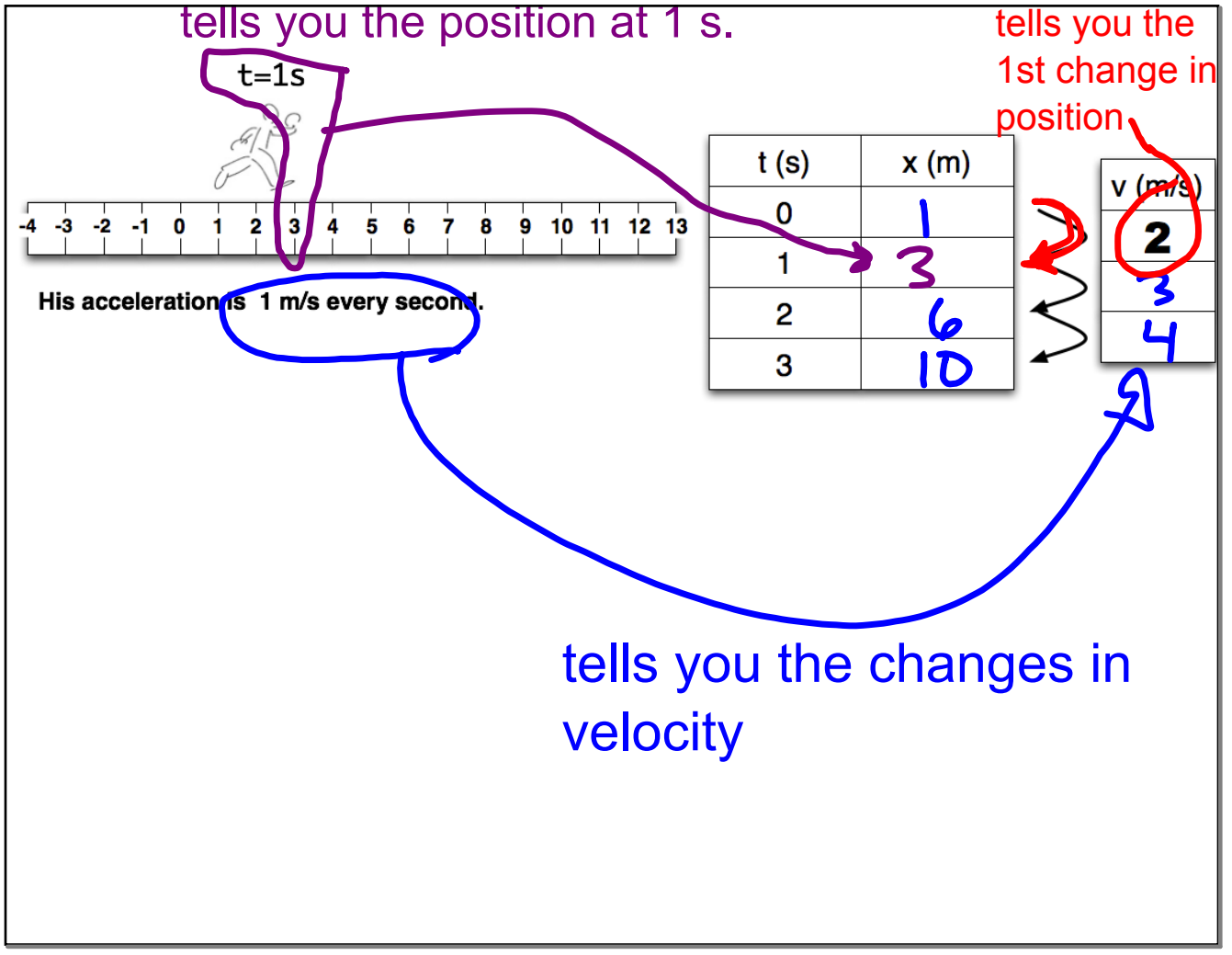
t=1s



His acceleration is 1 m/s every second.

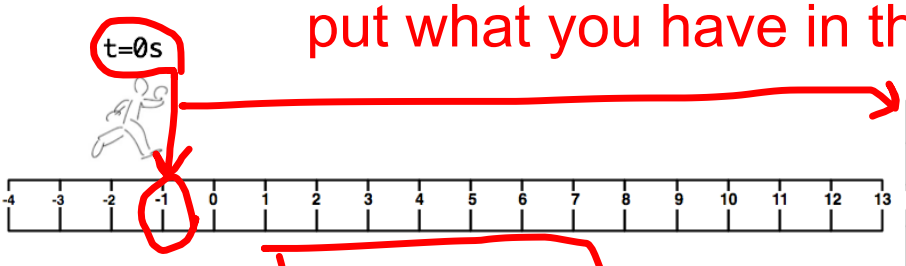
t (s)	x (m)
0	
1	
2	
3	

v (m/s)
2


tells you the position at 1 s.
t=1s
-4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13
His acceleration is 1 m/s every second.
t (s)
x (m)
0
1
2
3
1
3
6
10
tells you the 1st change in position
v (m/s)
2
3
4
tells you the changes in velocity

Third one on the front - Try it!

put what you have in the table



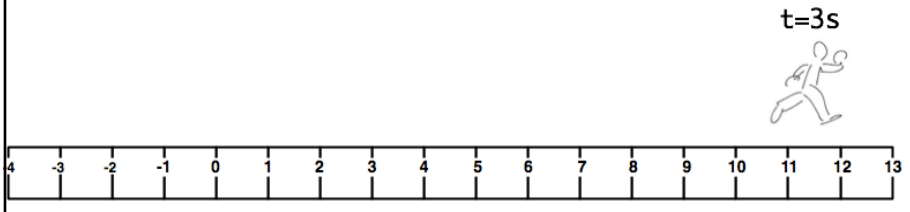
t (s)	x (m)
0	
1	
2	
3	

v (m/s)
1

His acceleration is 2 m/s every second.

tells you the jumps in these

Second one on the back - check yourself!



t (s)	x (m)
0	0
1	1
2	5
3	12

v (m/s)
1
4
7

His acceleration is 3 m/s every second.

(m/s) average speed = distance/time

(direction not included)

(m/s)
average velocity = change in position/time

(direction included: + = right; - = left)

(m/s/s)
acceleration = change in velocity each second. (direction included + = right; - = left)