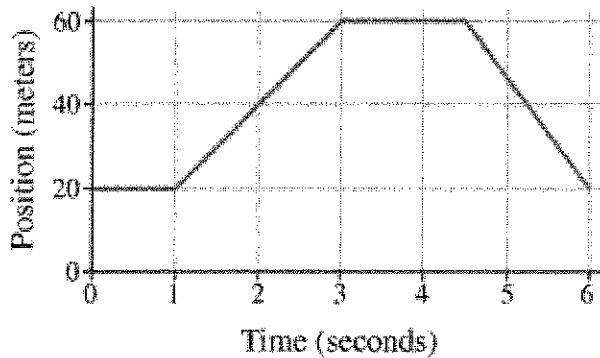


Skill 11: Velocity vs. time graphs

We have already learned how to analyze the motion of an object on a position vs. time graph.

The "rate of position" vs time is shown on a "velocity vs. time" graph

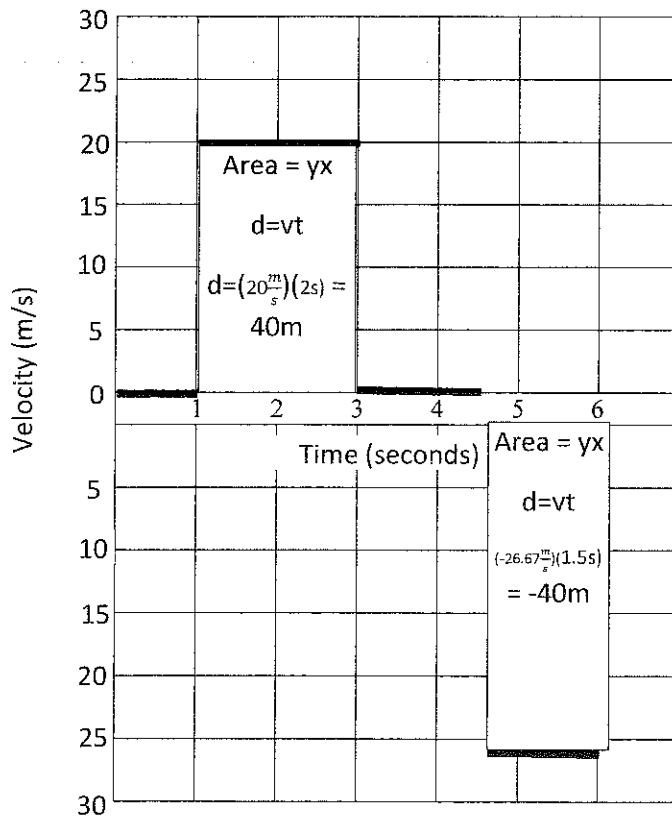


Description of position vs. time:

- The object stands still at the 20m mark for 1 second.
- The object then moves 20m each second for 2 seconds.
- The object then stands still for 1.5 seconds and then moves back toward the start 40m in 1.5 seconds.

Describing the velocity vs. time: (slope of d vs t)

- For the first second the velocity of the object is zero.
- For the next 2 seconds the velocity of the object is 20m/s ($v=40\text{m}/2\text{s}$)
- For the next 1.5 seconds the object has a velocity of zero.
- For the next 1.5 seconds the object has a velocity of negative 26.7 m/s.



New skill:

The relationship between distance, velocity and time is the equation:

$$d=vt$$

Relating to the graph, the distance is the product of the y and x axis or AREA bound by the graph. The total displacement is the sum of the individual areas.

DO NOT SIMPLY COUNT BOXES. USE THE NUMBERS ON THE AXES AS THE BASE AND HEIGHT FOR CALCULATING AREA.

THE SLOPE OF DISPLACEMENT vs. TIME IS THE VELOCITY (RATE OF CHANGE IN POSITION VS TIME).

THE VELOCITY IS THEN PLOTTED vs THE SAME TIME SCALE. THE AREA BOUND BY THE LINE IS THE DISPLACEMENT.