

Bell Work, Feb 23 – 26, 2015

IB Physics: area under the curve of a v-t graph, calculating Δx (displacement), instantaneous velocity, average velocity.

IB Physics Bell Work, Monday, Feb 23, '15 (4 Ques.)

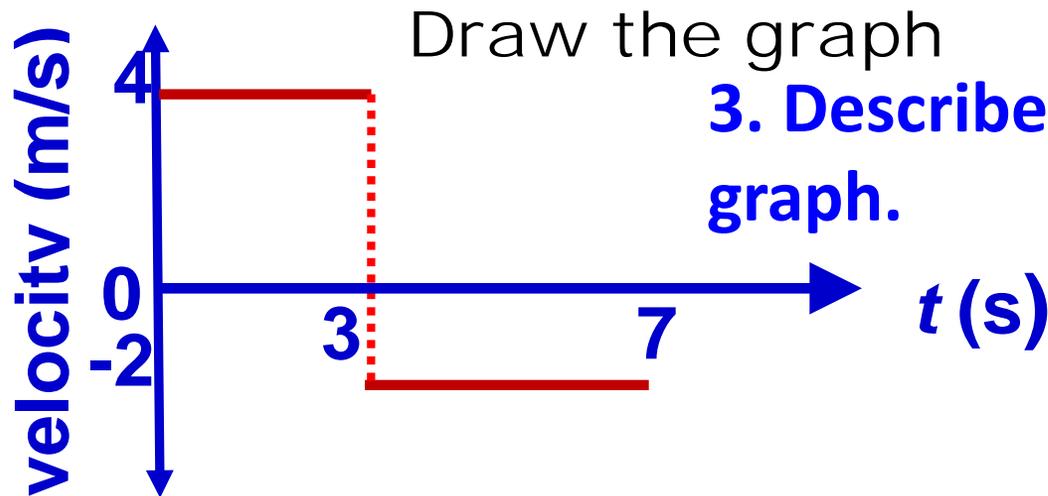
1. The change in an object's position calculated by subtracting the initial position from the final position, $\Delta x = x_f - x_i$, is

- a. acceleration
- b. average velocity
- c. displacement
- d. scalar magnitude

2. State two other ways to determine displacement, Δx .

By using the equation: $\Delta x = \bar{v} \cdot t$ (or $\bar{v} \cdot \Delta t$)

By finding the area under a v vs. t graph. (The area between the red & blue lines.)

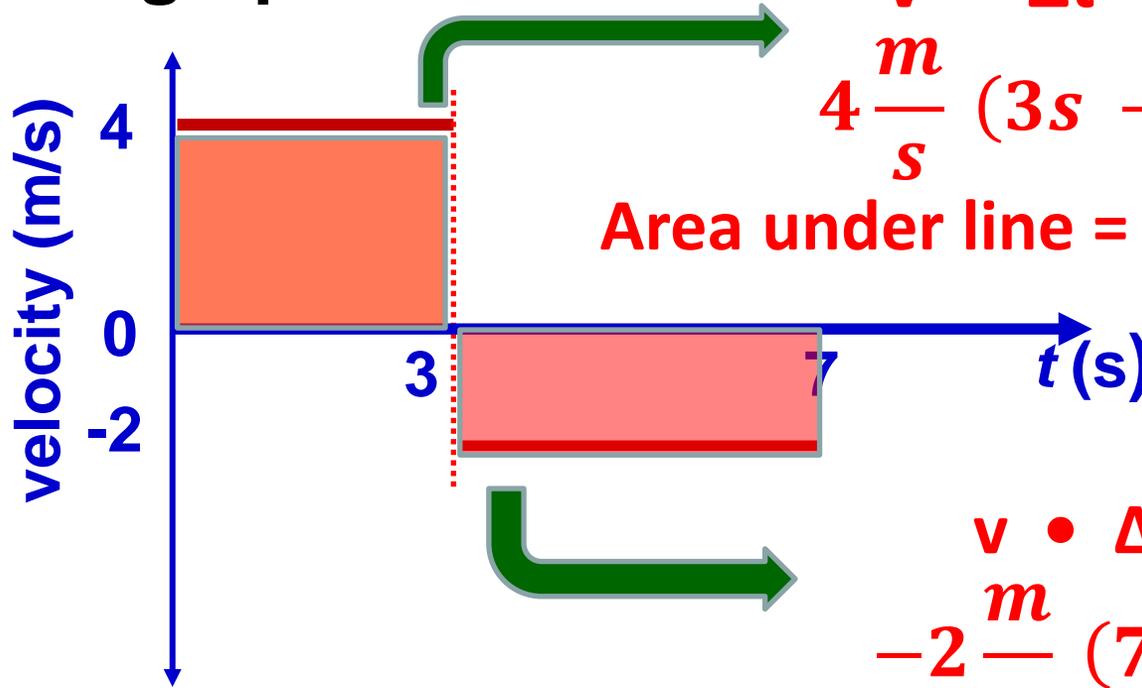


3. Describe the motion shown on this graph.

From 0 – 3 s (or for 3 s), the object moves at 4m/s and then reverses direction from 3 to 7 seconds (or for 4 seconds) and moves at -2 m/s.

IB Physics Bell Work Monday, Feb 23,

Draw the graph on the back



$$v \cdot \Delta t = \Delta x$$

$$4 \frac{m}{s} (3s - 0s) = 12m$$

$$\text{Area under line} = \Delta x = 4 \cdot 3 = 12 \text{ m}$$

$$v \cdot \Delta t = \Delta x$$

$$-2 \frac{m}{s} (7s - 3s) = -8m$$

$$\text{Area under line} = \Delta x = -2 \cdot 4 = -8 \text{ m}$$

4. What is the displacement (Δx) from 0 – 7 seconds?

From 0 s - 3 s, $\Delta x = 12 \text{ m}$.

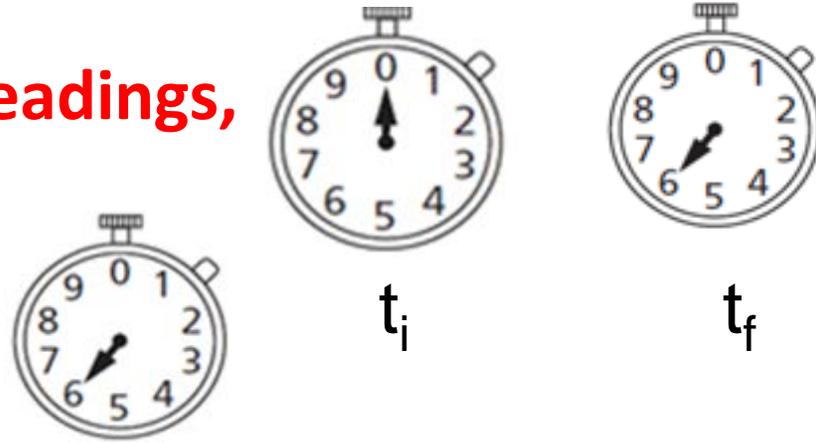
From 3 s - 7 s, $\Delta x = -8 \text{ m}$.

From 0 s - 7 s, $\Delta x = 12 \text{ m} + (-8 \text{ m}) = 4 \text{ m}$

IB Physics Bell Work, Tuesday, Feb 24

1. What is a time interval?

It is the difference between two clock readings, where $\Delta t = t_f - t_i$



2. What is an instant in time?

It is one clock reading at a single time.

Thus, the final time and the initial time are the same and $\Delta t = 0$

3. What is instantaneous velocity?

It is an object's speed at a given time instant (or a single *clock reading*).

4. What is the difference between average velocity and instantaneous velocity?

Average velocity is the average velocity over a time interval (2 more clock readings), instantaneous velocity is the velocity at one clock reading (a single instant in time).

IB Physics Bell Work Wednesday, Feb 25, (3 Ques.)

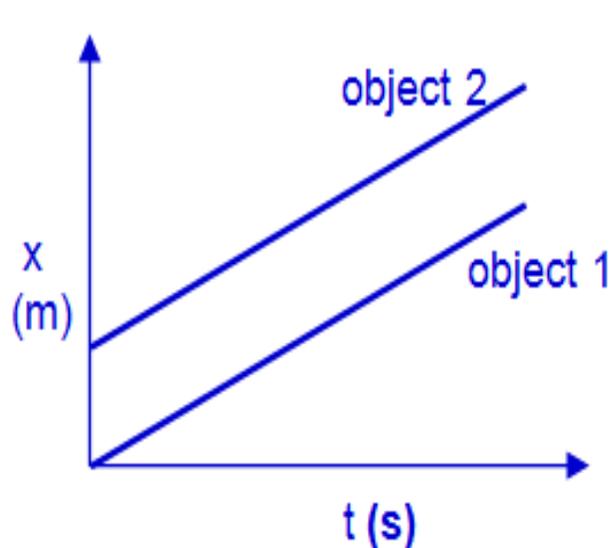


1. What is instantaneous velocity?

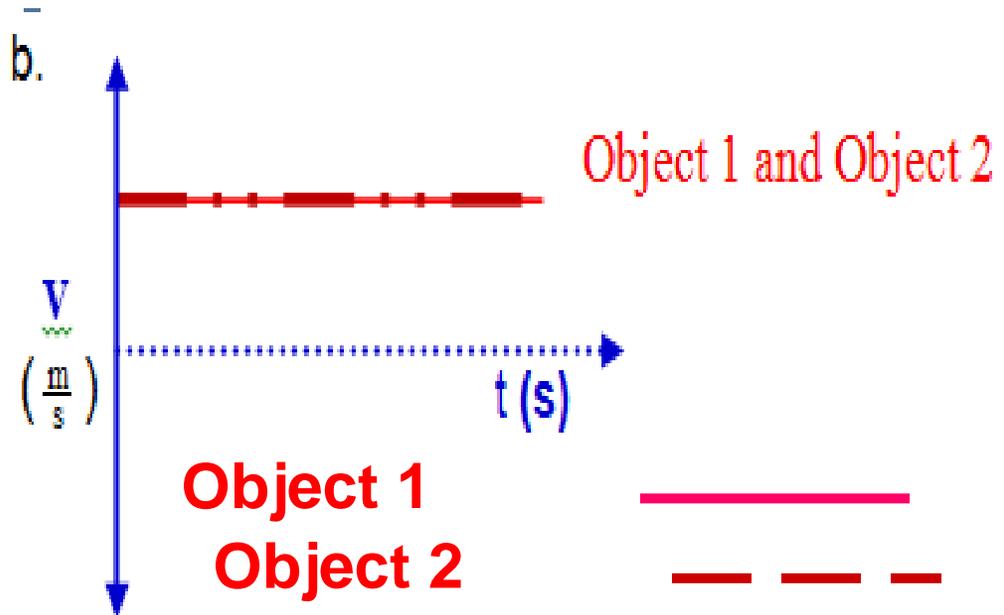
The speed and direction of an object at a particular point in time is called the instantaneous velocity

2. a. Describe, using a clear, complete sentence, how does the motion (not the graph shape) of object 2 differs from the motion of object 1 on the position – time graph below.

b. Sketch the graph of velocity vs time for object 1 and object 2. (label clearly)



a. Both objects travel in the same direction at the same speed, but object 2 has a head start.



IB Physics Bell Work Wednesday, Feb 25, (3 Ques.)

3. Suppose you are given a position versus time graph. The slope of a line drawn tangent to a point on the curve of this graph describes what quantity?

a. acceleration

c. instantaneous velocity

b. displacement

d. position.

Physics Bell Work, Thursday, Sept 26

#10

1. Draw a line tangent to the graph at $t = 3.0$ s.
2. Calculate the slope of this tangent line. Compare average & instantaneous velocity.
3. Explain what the slope of tangent line tells you about the motion of the object.
4. Explain the difference between the slope of a time interval and the slope at one point.

