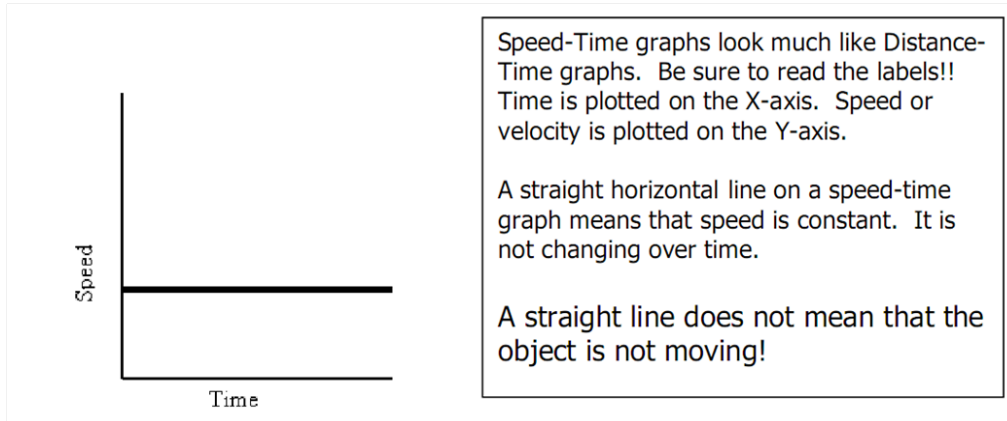
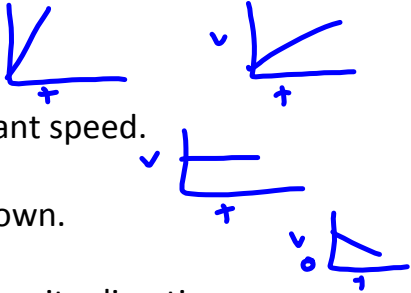
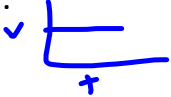


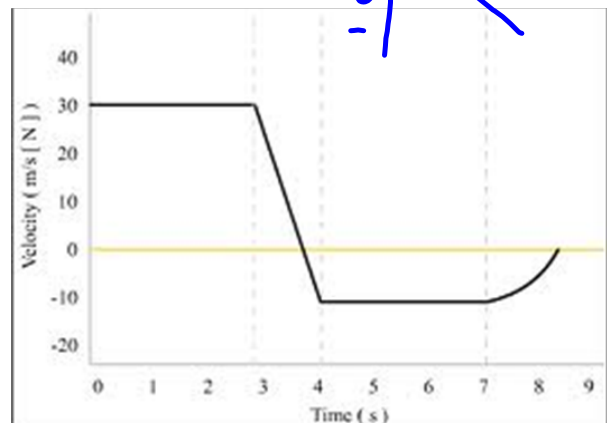
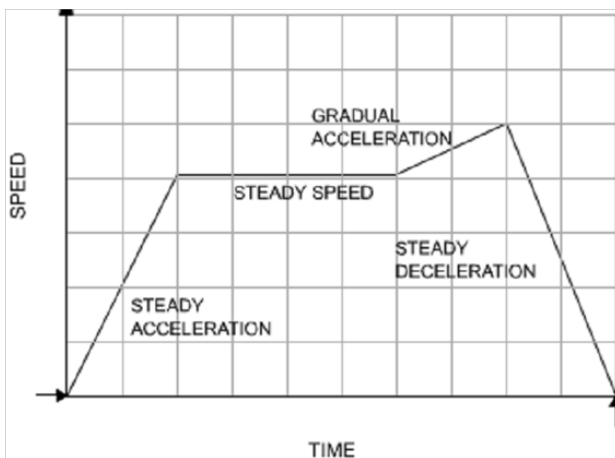


Speed or Velocity vs. Time graph



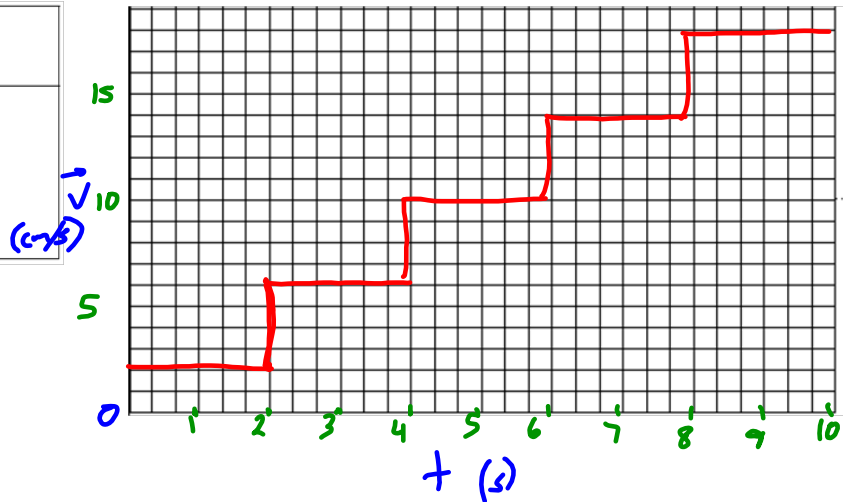
Speed/Velocity vs. Time graph keys

- A speed - time graph shows us how the speed of a moving object changes with time.
- The steeper the line, the greater the acceleration. ✓ 
- A horizontal line means the object is moving at a constant speed. ✓ 
- A downward sloping line means the object is slowing down. ✓ 
- Negative velocity means the object is moving in the opposite direction ✓ 



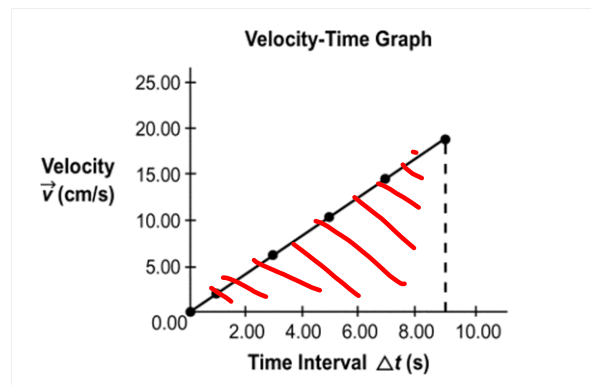
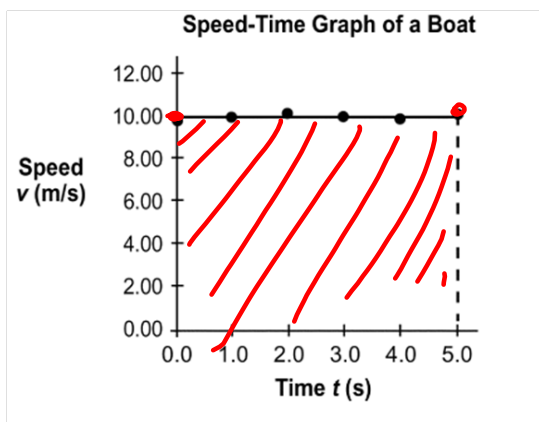
Creating a speed/velocity vs. time graph

Time Interval Δt (s)	Velocity \bar{v} (cm/s)
0.00 – 2.00	2.00
2.00 – 4.00	6.00
4.00 – 6.00	10.00
6.00 – 8.00	14.00
8.00 – 10.00	18.00



Analyzing a speed/velocity vs. time graph

- The area under the line tells us the distance (for speed-time) or displacement (for velocity-time) that the object travelled.
- The slope tells us the acceleration of the object.



Calculate the acceleration and distance or displacement for the object in each of these graphs.

$$\begin{aligned} \text{area} &: b \times h \\ &: 5.0s \times \frac{10m}{s} \\ &: 50m \end{aligned}$$

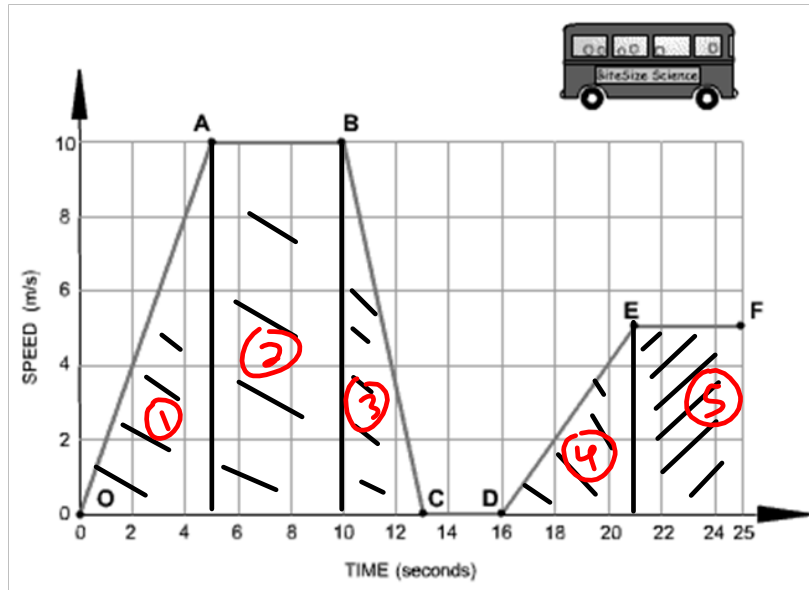
$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{0m/s}{5.0s} = 0m/s/s$$

$$\begin{aligned} \text{area:} & \text{ (displacement)} \\ & \frac{b \times h}{2} = \frac{9.00s \times 20.00 \frac{cm}{s}}{2} \\ & = \boxed{90.00m} \end{aligned}$$

$$\begin{aligned} \text{slope} & \text{ (acceleration)} \\ &: \frac{\text{rise}}{\text{run}} = \frac{20cm/s}{9s} \\ & = 2.22... \frac{cm}{s/s} \\ & = \boxed{2.22 \frac{cm}{s/s}} \end{aligned}$$

Practice Sheet 5

1. The graph below shows how the speed of a bus changes during part of a journey



a. Calculate the slope of the line from point 0 to point A. What does the slope tell us?

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{10\text{m/s}}{5\text{s}} = 2\text{m/s/s} = 2\text{m/s}^2$$

b. Describe the motion of the bus from point A to B.

c. Calculate the total distance travelled by the bus for the whole 25 s trip.

① $a = \frac{b \times h}{2}$
 $a = \frac{10\text{m} \times 5\text{s}}{2}$
 $a = 25\text{m}$

② $a = b \times h$
 $= 5\text{s} \times 10\frac{\text{m}}{\text{s}}$
 $= 50\text{m}$

③ $a = \frac{b \times h}{2}$
 $a = \frac{3\text{s} \times 10\frac{\text{m}}{\text{s}}}{2}$
 $= 15\text{m}$

④ $a = \frac{b \times h}{2}$
 $a = \frac{5\frac{\text{m}}{\text{s}} \times 5\text{s}}{2}$
 $= 12.5\text{m}$

⑤ $a = b \times h$
 $= 5\frac{\text{m}}{\text{s}} \times 4\text{s}$
 $= 20\text{m}$

total area : distance : 122.5m
 $= 123\text{m}$