Notes 2.1 – Position-Time Graphs

Name: Key Date: _____ Hour: _____

Learning Goals:

1. Describe and analyze the motion represented by a position-time graph.

I. Interpreting the Data Points:

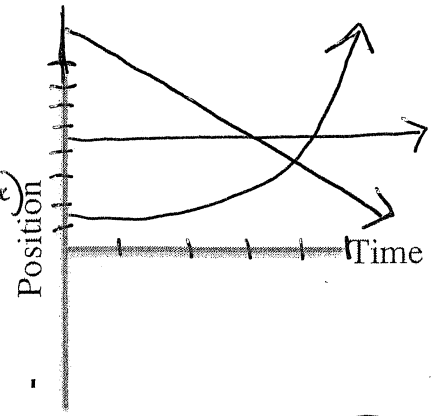
A. Positive Values:

example

t(s)	P(m)
1	0
2	2
3	4
4	6
5	8

* Points are above the x-axis (all y-values positive)

→ Object is in front of the ref. point.



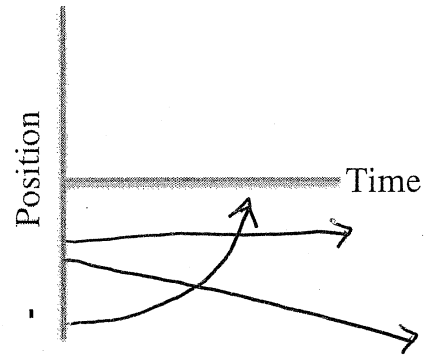
B. Negative Values:

ex.

t	P
1	0
2	-2
3	-4
4	-6
5	-8

* Points are under the x-axis. (all y-values are negative)

→ Object is behind the reference point.



II. Determining Slope: $\frac{\text{rise}}{\text{run}}$ = slope = $\frac{\Delta \text{position (m)}}{\Delta \text{ time (s)}}$ = Velocity !!!

* slope = velocity (on position/time graph)

III. Interpreting Straight Slope: = constant velocity

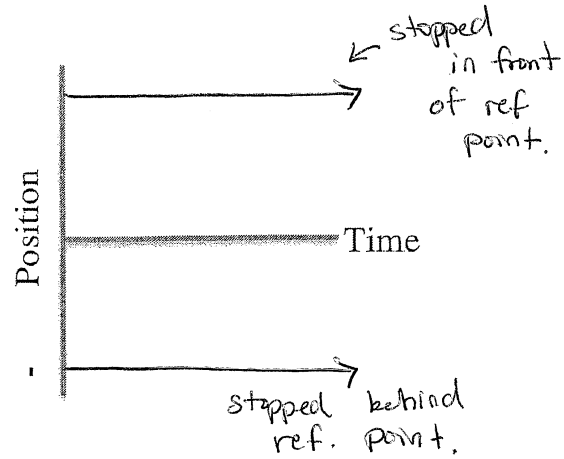
ex

Cruise control, stopped, etc.

A. Horizontal: = no slope = Ø = STOPPED !

NO SLOPE

NO VELOCITY

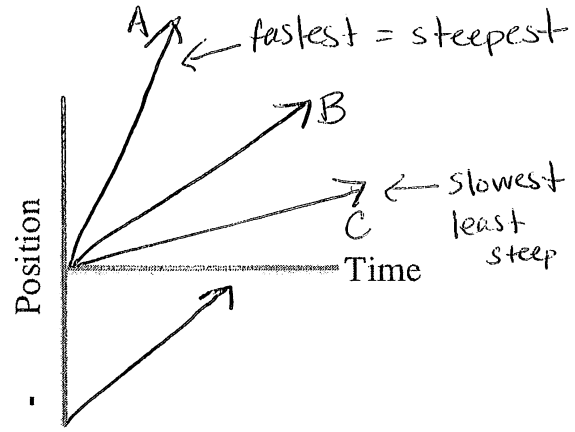


B. Straight, Tilted up: = positive slope

↓ ↓ = positive velocity

Constant positive

Constant positive velocity
← going forward

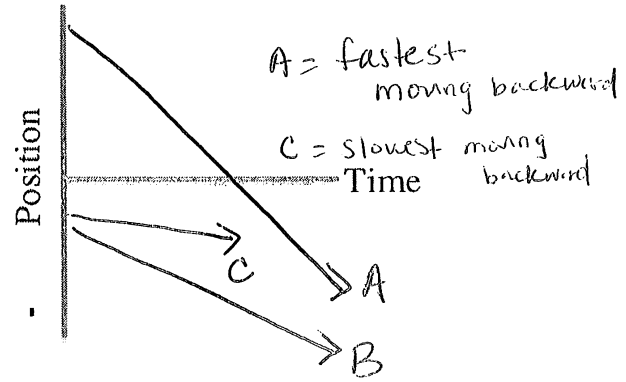


C. Straight, Tilted down:

↓ ↓

Constant negative

Constant negative velocity
← going backwards



IV. Interpreting Curved Slope:

↳ Changing Slope = Changing velocity = ACCELERATION!

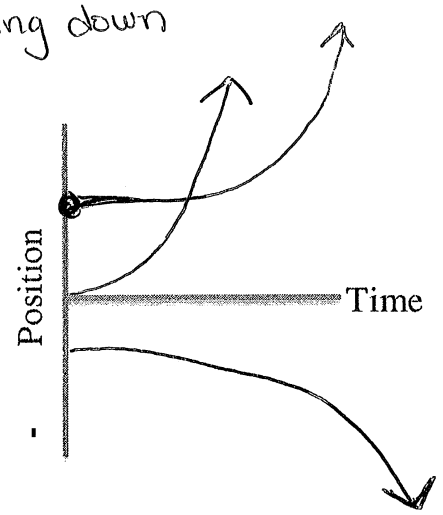
* Object is speeding up OR slowing down

A. Curved, gets steeper:

SPEEDING UP

More horizontal → steeper, over time

Slower → faster

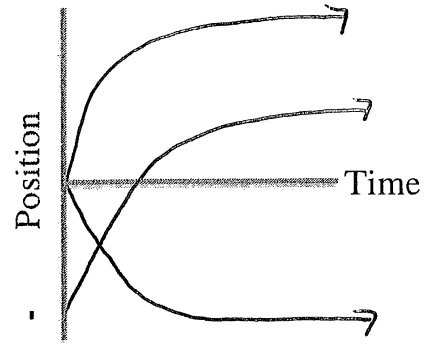


B. Curved, levels out:

SLOWING DOWN

Steeper → more horizontal

faster → slower



Notes 2.2 – Velocity-Time Graphs

Name: Key Date: _____ Hour: _____

Learning Goals:

2. Describe and analyze the motion represented by a velocity-time graph (P2.2C).

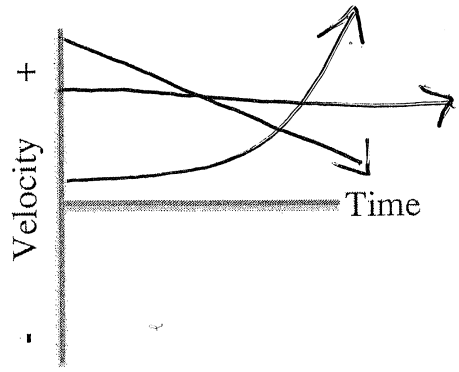
I. Interpreting the Data Points:

A. Positive Values:

t (s)	V (m/s)
0	1
1	2
2	3
3	4

* Points are above the x-axis.

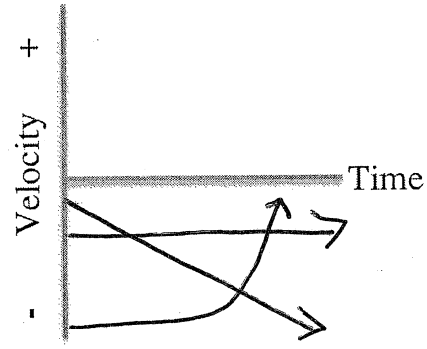
→ Object has a positive velocity, moving forward.



B. Negative Values:

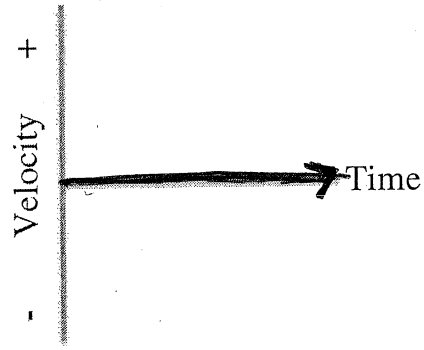
* points are below the x-axis

→ Object has a negative velocity, moving backward.



C. How would you represent an object that isn't moving at all (velocity = 0m/s)?

* Horizontal Line on y = 0 (x-axis)
* Object has no velocity
Not moving.



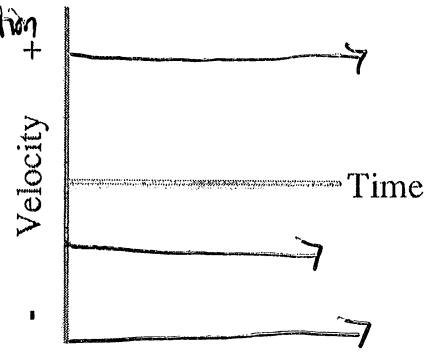
II. Determining Slope: $\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta \text{ Velocity (m/s)}}{\Delta \text{ time (s)}}$ = Accelleration!!

Slope = Acceleration (on velocity / time graph)

III. Interpreting Straight Slope: Constant slope = constant acceleration

A. Horizontal: = Ø slope = no acceleration

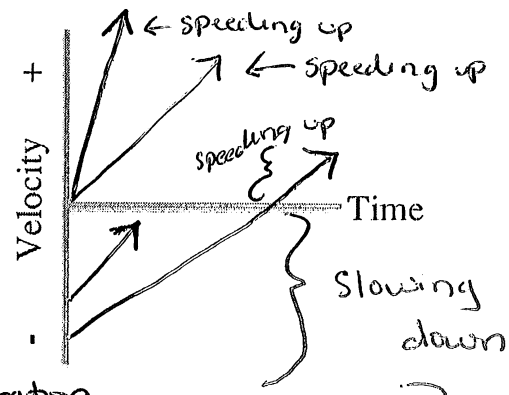
Constant velocity



B. Straight, Tilted up: constant acceleration, positive acceleration

positive velocity + positive accel = Speeding up

neg. velocity + positive accel = Slowing down

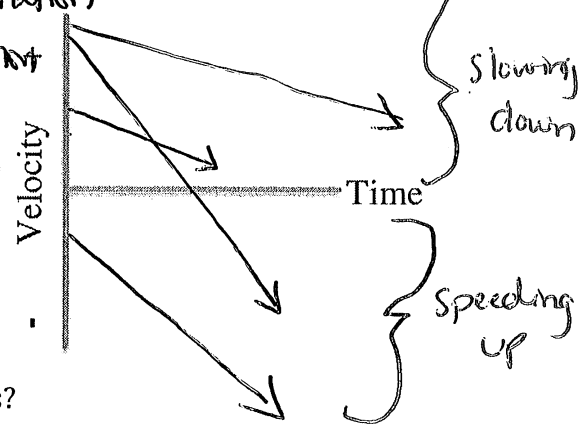


C. Straight, Tilted down: constant acceleration

negative acceleration

positive velocity + neg. accel = SLOWING DOWN

negative velocity + neg. accel = SPEEDING UP



D. What does it mean when the line crosses the x-axis?

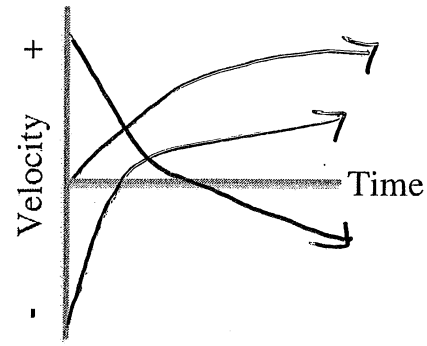
Changes direction forward → backward

or backward → forward

speeding up → slowing down

IV. Interpreting Curved Slope:

Changing acceleration



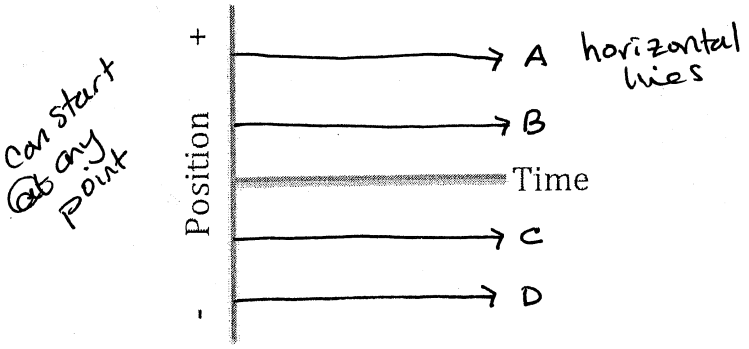
Notes 2.3 – Using Graphs to Make Graphs

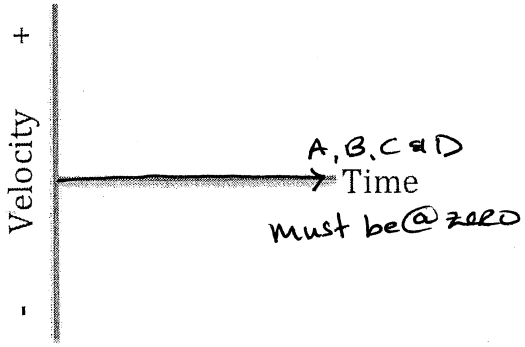
Name: KEY Date: _____ Hour: _____

Learning Goal:
#3-Use a position-time graph to create a velocity-time graph and vise versa (P2.1D & P2.2C).

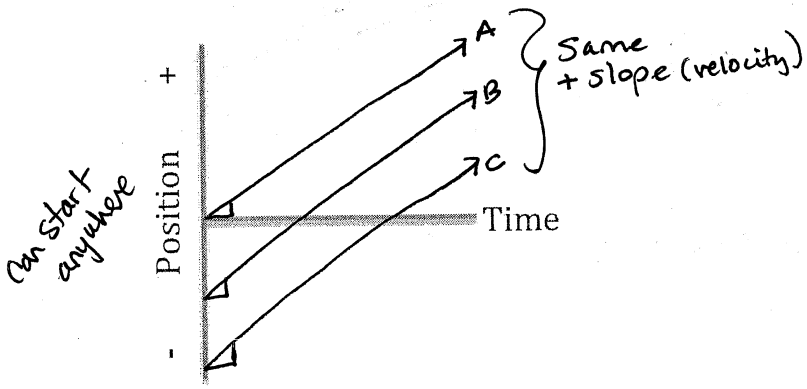
Graph Comparison

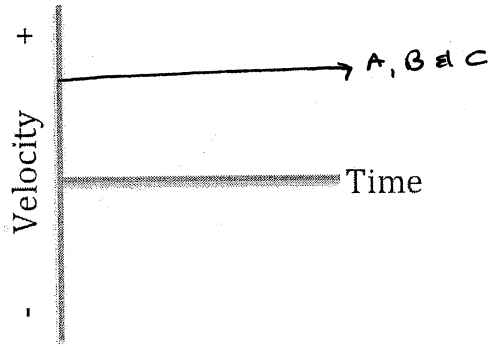
1. **Not Moving/At Rest/Velocity of zero**



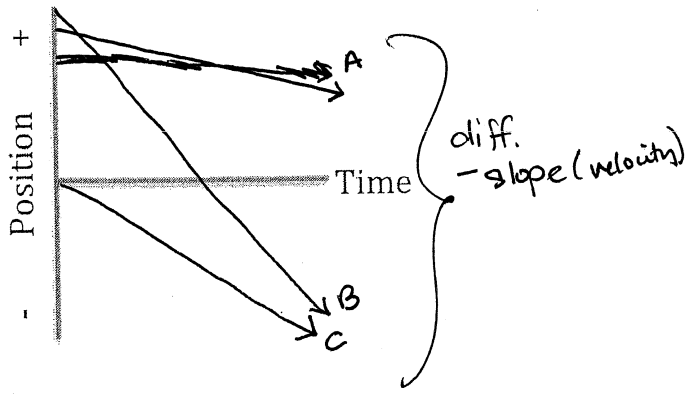


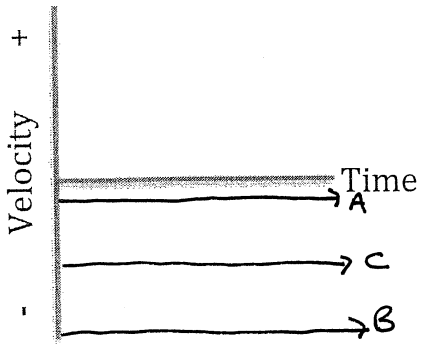
2. **Constant, forward or positive velocity/No acceleration**





3. **Constant, backward or negative velocity/ No acceleration**





4. **Changing velocity/ Constant acceleration** (assumed)