Measuring 7   **Mr. Murray's Regular Physics**

Linear Motion

I passed out copies of this in class. That copy doesn't have the due dates on top.

Displacement, Velocity, and Acceleration – *Defining positives and negatives*

Δx - Displacement – how far you moved from your original position.
+ - moving toward the positive direction (right) (think of the number line).
– - moving toward the negative direction.
0 - ended up at your starting position ($v_i = v_f$)

Δv - Velocity – how fast you are moving in a particular direction.
+v - moving in the positive direction;
–v - moving in the negative direction.
0 – not moving (at rest); this means no change of position: $\Delta x = 0$

a - Acceleration -
+ - adding positive velocity (faster in the pos. direction) or losing negative velocity.
– - adding negative velocity (faster in the neg. direction) or losing positive velocity.
0 – at constant velocity (which could be 0); $\Delta v = 0$.

An object moves from 3 m away to 8 m away. Find the displacement.

An object moves from –2 m to 4 m away. Find Δx.

An object moves from 8 m to –6 m away. Find Δx.

An object moves from –12m to –4m. Find Δx for the whole journey.

An object moves from –6 m to –2 m. Was the object's velocity positive or negative?

An object moves from 20m to 5 m. Was the object's velocity positive or negative?

An object moves from 10m to –10m. Was the object's velocity positive or negative?

An object moves from –5m to 5 m. Was the object's velocity positive or negative?

An object moving at 10 m/s ends up going 20 m/s. Was the object's acceleration positive or negative?

An object moving at 30 m/s ends up going 5 m/s. Was the object's acceleration positive or negative?

An object moving at –5 m/s ends up going 5 m/s. Was the object's acceleration positive or negative?
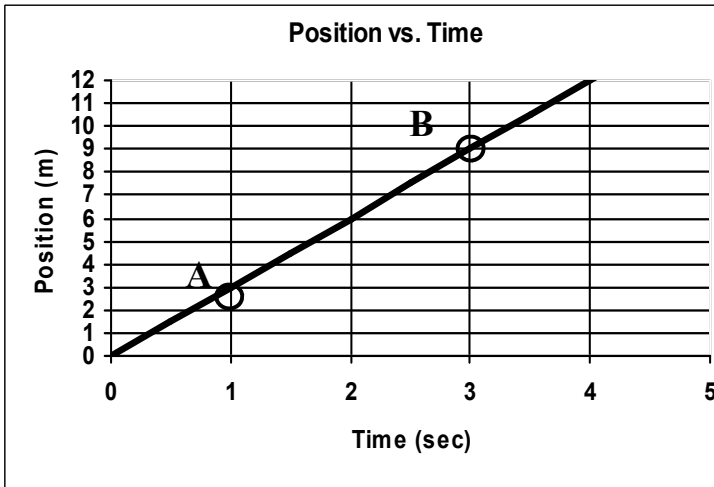
An object moving at 10 m/s ends up going 0 m/s (stops). Was the object's acceleration positive or negative?

An object moving at –5 m/s ends up going -20 m/s. Was the object's acceleration positive or negative?
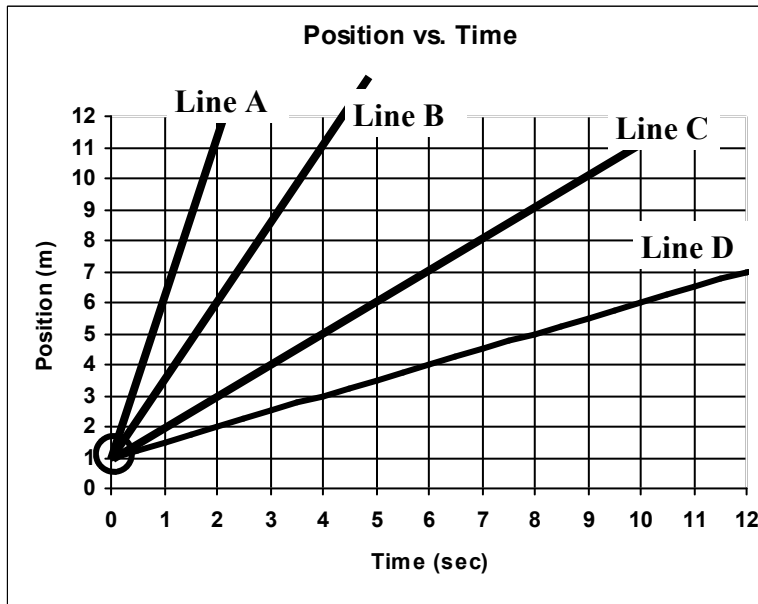
An object moving at –20 m/s ends up going –10 m/s. Was the object's acceleration positive or negative?

Problems

1. An object is going 50 m/s to the left, later it is going 10 m/s to the right, find the change of velocity.

2. An object is going –4 m/s. If after traveling 16 sec, it is going 12 m/s, find the acceleration of the object.

3. An object moves from 4 m to –12 m in 6 seconds. Find its velocity.

4. An object accelerates 3 m/s^2 for 10 seconds. If it started at – 4 m/s, how fast is it going afterward?

Position vs. Time

Position (m) vs **Time (sec)**

(Graph showing points A and B on a straight line through origin)

1. What does the x-axis show?
2. What does the y-axis show?
3. How far does the object move from A to B?

4. How long does it take the object to move from A to B?

5. Put this information together: what does this mean?

6. What do we call this quantity?

Position vs. Time

Line A   Line B   Line C   Line D

Position (m) vs **Time (sec)**

(Graph showing four lines A, B, C, D from origin)

Circle where each line crosses 6m.

What is the initial position of each line?

Use 6m as your final position.

What is the Δx for each line?

How long does it take each line to reach 6m?

Line A: Line B:

Line C: Line D:
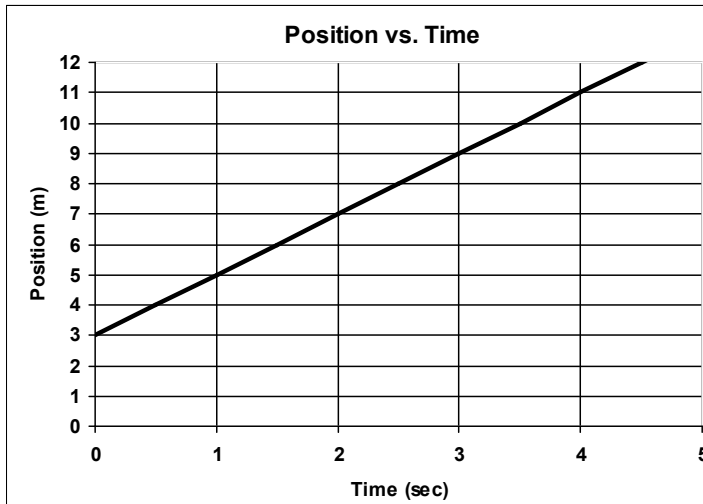
Calculate the velocity of each line.

Line A: Line B:

Line C: Line D:

Which line shows the fastest velocity?   Which line shows the slowest velocity?

What did you learn about slope and velocity?

Position vs. Time

Position (m) vs **Time (sec)**

(Graph showing a straight line)

1. Mark the dependent and independent variables.
2. Where will the object be at 3 seconds?
3. When will the object be 7 meters away?
4. Put a square around the y-intercept.
5. Circle two "good points" on the line.
6. Find the slope:

7. What is the y-intercept?

8. Write the linear equation for this graph:

9. When will the above object be 15 meters away?