Name _____ Date _____

Physics Lab #4 (30 pts)

Period _____ Mrs. Nadworny

Partners: Due Date _____

Describing Motion

NO Lab Write-Up Required

Purpose

To describe the motion of a toy verbally and graphically using a frame of reference.

Materials

- toy truck
- 2 meter sticks
- pencil
- 2 pieces of scrap paper

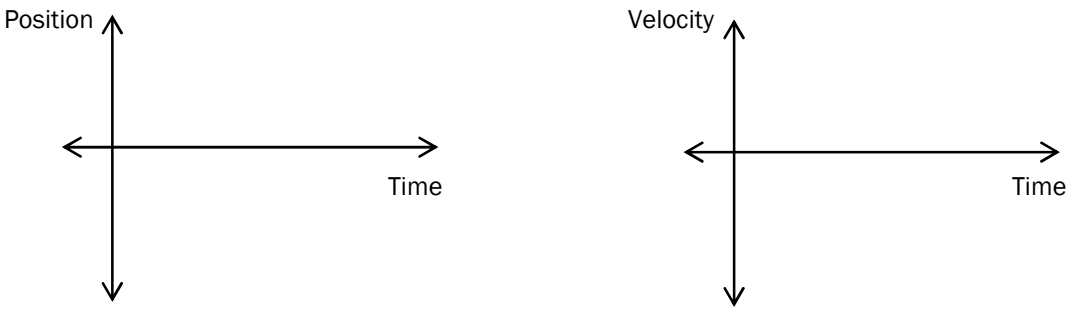
Procedure:

1. Turn on the toy truck and let it move across the floor. Describe its motion in words in the space below. Use the terms distance, speed and acceleration. (2 pts)

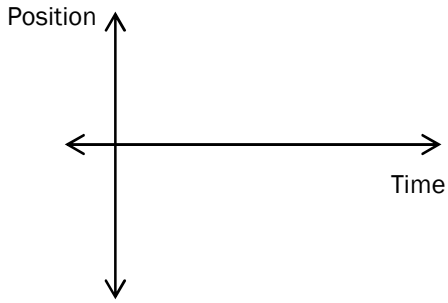
   - The distance car travels _____ as it moves across the floor.
   - The velocity of the car _____ as it moves across the floor.
   - The acceleration of the car _____ as it moves across the floor.

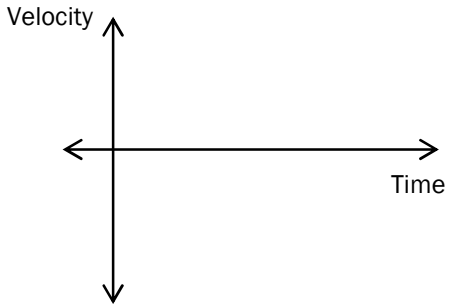
2. Mark a "**+**" and an arrow on one sheet of scrap paper and a "**-**" and an arrow on the other. Now, set up a frame of reference, as shown below, by placing the two meter sticks end to end and putting the +/- arrows at either end as shown below. The origin is where the two sticks touch. The zero end of the meter sticks should both be at the origin.

3. Put your truck at the origin and let it move in the positive direction. Sketch the following graphs: position-time and velocity-time. (2 pts)

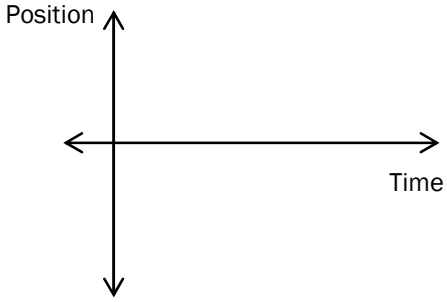


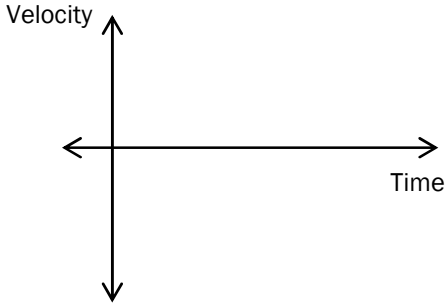
4. Now, start your truck 30 cm in front of the origin and let it go. Sketch the graphs. (2 pts)





5. Now, start your truck 30 cm behind the origin and let it go. Sketch the graphs. (2 pts)





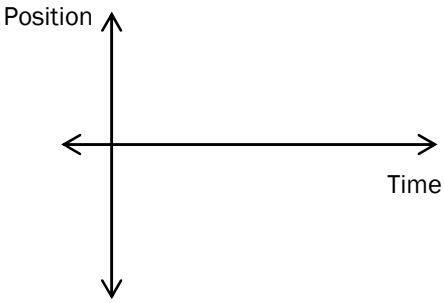
6. How do the position-time graphs change when you change the starting point of the truck? (1 pt)

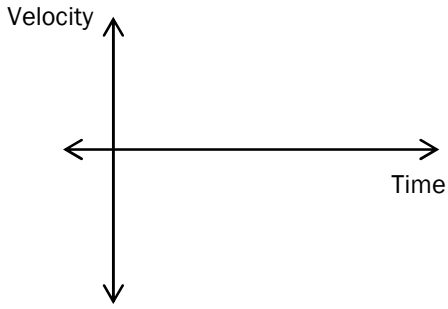
_____

7. How do the velocity-time graphs change when you change the starting point of the truck? (1 pt)

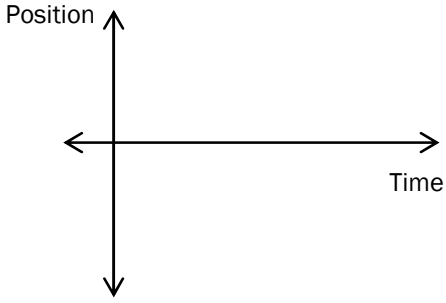
_____

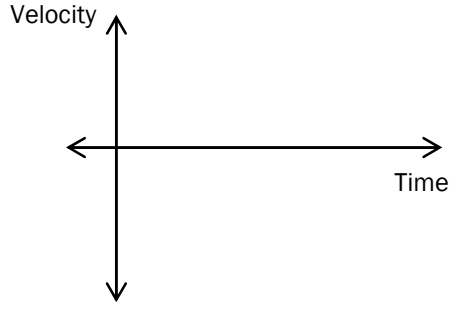
8. Put your truck at the origin and let it move in the negative direction. Sketch the graphs. (2 pts)



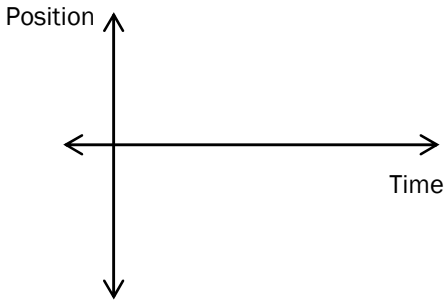


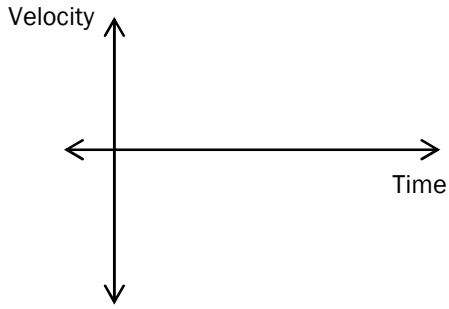
9. Now, start your truck at +30 cm and let it travel in a negative direction. Sketch the graphs. (2 pts)





10. Now, start your truck at –30 cm and let it travel in a negative direction. Sketch the graphs. (2 pts)





11. How do the position-time graphs change when the truck travels in a negative direction? (1 pt)

_____

12. How do the velocity-time graphs change when the truck travels in a negative direction? (1 pt)

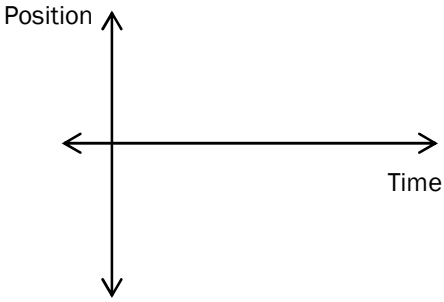
_____

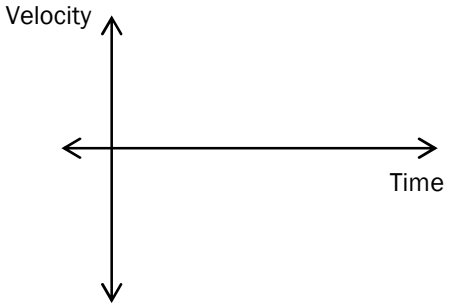
13. Does a negative velocity mean the truck is traveling in reverse? What does it mean? (1 pt)

_____

_____

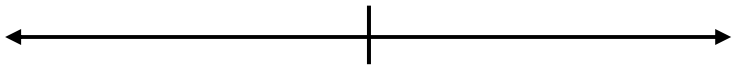
14. Now, start the truck at the origin, let it travel one meter in the positive direction and then quickly turn it around so that it travels in the negative direction for two meters. Sketch the graphs. (3 pts)



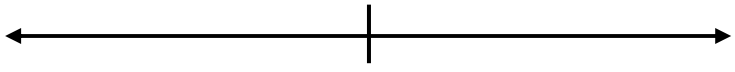


Questions: (1 pt each)

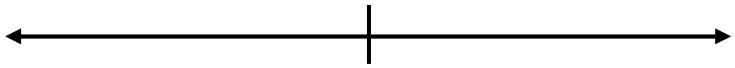
1. On the following coordinate system, place an "X" to represent a positive position.



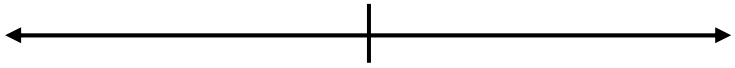
2. On the following coordinate system, place an "X" to represent a negative position.



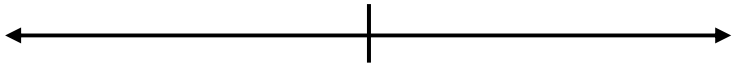
3. On the following coordinate system, draw an arrow to represent a positive displacement and a positive position.



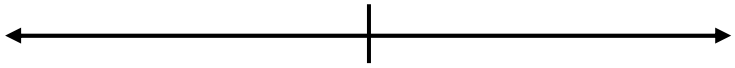
4. On the following coordinate system, draw an arrow to represent a positive displacement and a negative position.



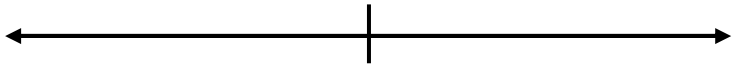
5. On the following coordinate system, draw an arrow to represent a negative displacement and a positive position.



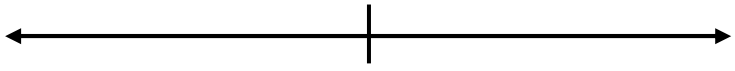
6. On the following coordinate system, draw an arrow to represent a negative displacement and a negative position.



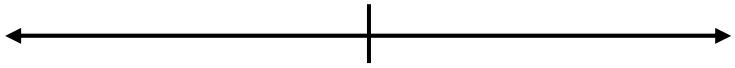
7. On the following coordinate system, draw an arrow to represent a positive velocity and a positive position.



8. On the following coordinate system, draw an arrow to represent a positive velocity and a negative position.



9. On the following coordinate system, draw an arrow to represent a negative velocity and a positive position.



10. On the following coordinate system, draw an arrow to represent a negative velocity and a negative position.