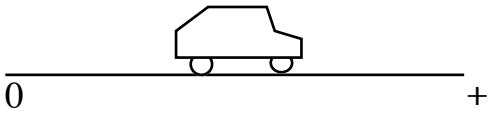
Name_____Date_____Partners_____

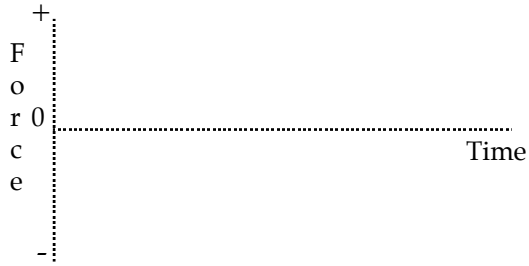
HOMEWORK FOR UNIT 5-2: COMBINING FORCES

Questions 1--5 refer to a toy car which can move in either direction along a horizontal line (the + position axis).



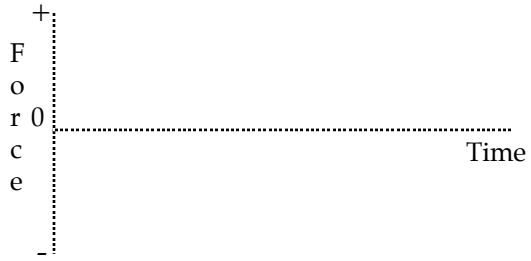
Assume that friction is so small that it can be ignored. Sketch the shape of the graph of the applied force which would keep the car moving as described in each statement.

1. The toy car moves away from the origin with a constant velocity.



2. The toy car moves toward the origin with a constant velocity.

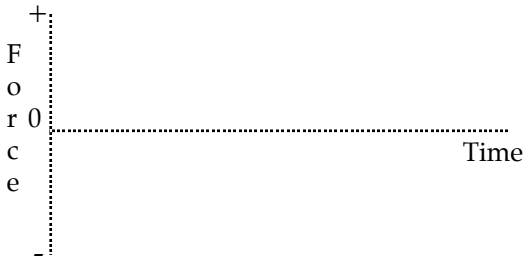
3. The toy car moves away from the origin with a steadily decreasing velocity (a constant acceleration).



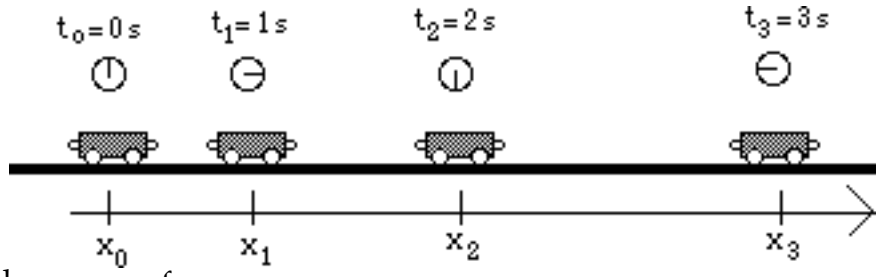
4. The toy car moves away from the origin, speeds up and then slows down.

5. The toy car moves toward the origin with a steadily increasing velocity (a constant acceleration).

6. The toy car is given a push away from the origin and released. It continues to move with a constant velocity. Sketch the force after the car is released.



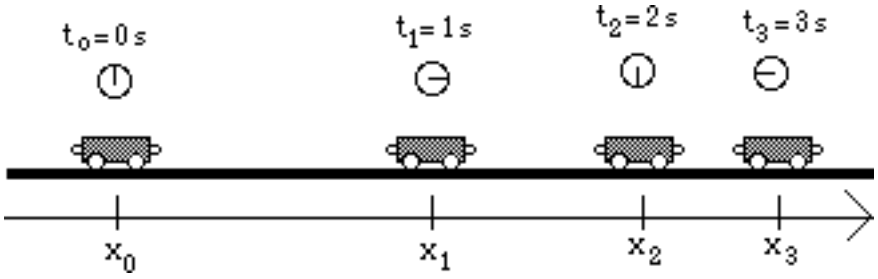
7. A cart is moving toward the right and speeding up, as shown in the diagrams below. Draw arrows above the cart representing the magnitudes and directions of the net (combinec) forces you think are needed on the cart at t = 0 s, t = 1 s, etc. to maintain its motion with a steadily increasing velocity.



Explain the reasons for your answers.

8. If the positive direction is toward the right, what is the sign of the force at t = 2 sec in question 7. Explain.

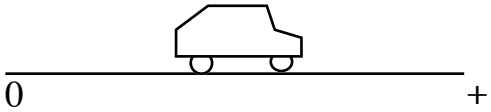
9. A cart is moving toward the right and slowing down, as shown in the diagrams below. Draw arrows above the cart representing the magnitudes and directions of the net(combined) forces you think are needed on the cart at t = 0 s, t = 1 s, etc. to maintain its motion with a steadily decreasing velocity.



Explain the reasons for your answers.

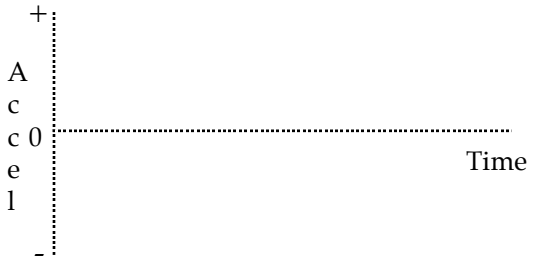
10. If the positive direction is toward the right, what is the sign of the force at t = 2 sec in question 9? Explain.

11. A toy car can move in either direction along a horizontal line (the + position axis).



Assume that friction is so small that it can be ignored. A force toward the right of constant magnitude is applied to the car.

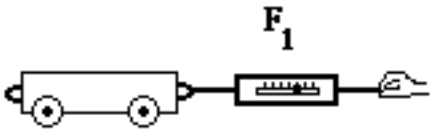
Sketch on the axes below using a solid line the shape of the acceleration-time graph of the car.



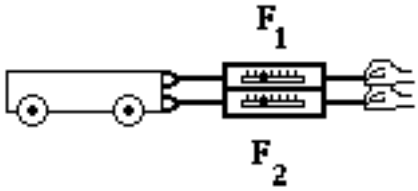
Explain the shape of your graph in terms of the applied force.

In questions 12-15, assume that friction is so small that it can be ignored.

12. The spring scale in the diagram below reads 10.5 N.

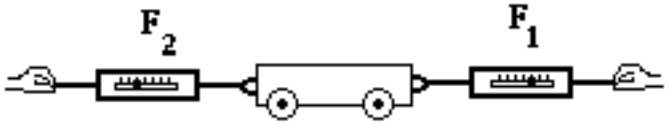


The cart moves toward the right with an acceleration toward the right of 3.25 m/s/s. Now two forces are applied to the cart with two different spring scales as shown below. The spring scale F_1 still reads 10.5 N.



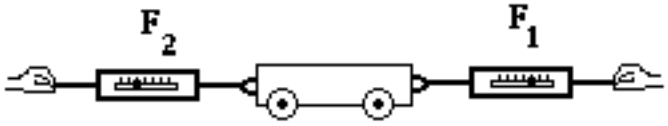
The cart now moves toward the right with an acceleration toward the right of 5.50 m/s/s. What does spring scale F_2 read? Show your calculations, and explain.

13. Now two forces are applied to the cart with two different spring scales as shown below. The spring scale F_1 still reads 10.5 N.



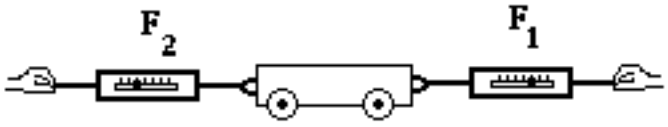
The cart now moves toward the right with an acceleration toward the right of 2.50 m/s/s. What does spring scale F_2 read? Show your calculations, and explain.

14. Again two forces are applied to the cart with two different spring scales as shown below. The spring scale F_1 still reads 10.5 N.



The cart moves with a constant velocity toward the right. What does spring scale F_2 read? Show your calculations, and explain.

15. Again two forces are applied to the cart with two different spring scales as shown below. The spring scale F_1 still reads 10.5 N.



The cart moves toward the left with an acceleration toward the left of 2.50 m/s/s. What does spring scale F_2 read? Show your calculations, and explain.