

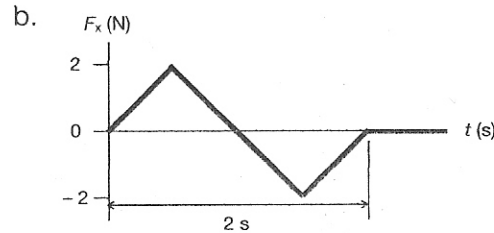
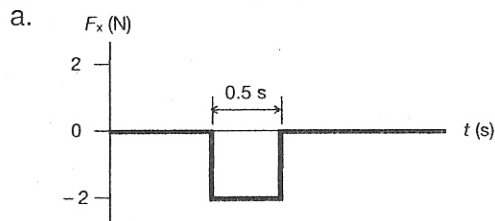
## Physics 2 - Classical Mechanics

### Practice questions

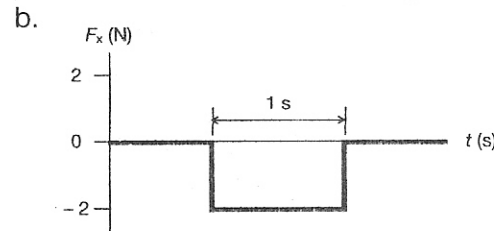
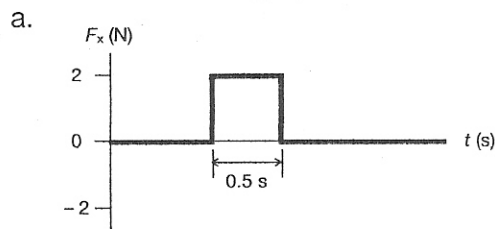
INSTRUCTIONS: Answer the problems in your notebook and submit a photocopy of your solutions, diagrams and answers during class (I will check that the photocopy is indeed from your notebook.) Show all your solutions and box your answers.

### Impulse and Momentum

1. A 2 kg object is moving to the right with a speed of 1 m/s when it experiences an impulse due to the force shown in the graph. What is the object's speed and direction after the impulse?



2. A 2 kg object is moving to the left with a speed of 1 m/s when it experiences an impulse due to the force shown in the graph. What is the object's speed and direction after the impulse?



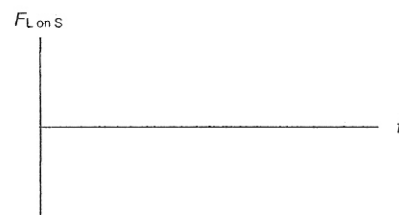
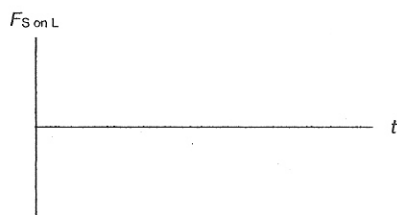
3. A falling rubber ball bounces on the floor.

- Use the language of force, acceleration, and action/reaction to describe what happens.
- Use the language of impulse and momentum to describe what happens.

4. A small, light ball S and a large, heavy ball L move toward each other, collide, and bounce apart.



- Compare the force that S exerts on L to the force that L exerts on S. That is, is  $F_{S \text{ on } L}$  larger, smaller, or equal to  $F_{L \text{ on } S}$ ? Explain.
- Compare the time interval during which S experiences a force to the time during which L experiences a force. Are they equal, or is one larger than the other?
- Sketch the graph showing a *plausible*  $F_{S \text{ on } L}$  as a function of time. Be sure to think about the *sign* of each force.

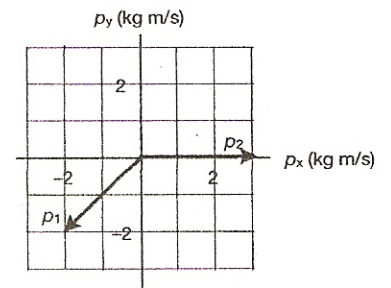


- Compare the impulse delivered to S to the impulse delivered to L. Explain.
- Compare the momentum change of S to the momentum change of L.
- Compare the velocity change of S to the velocity change of L.
- What is the change in the *sum* of the momentum of the two balls? Is it positive, negative, or zero?

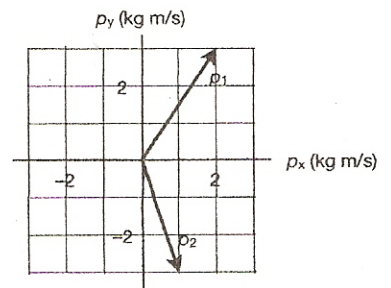


## Momentum in Two Dimensions

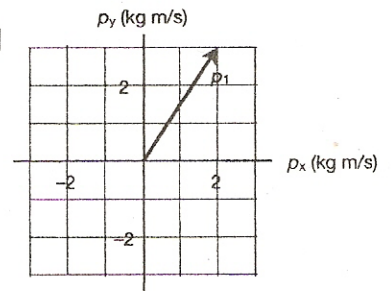
13. An object initially at rest explodes into three fragments. The momentum vectors of the two fragments are shown. Draw the momentum vector  $p_3$  of the third fragment.



14. An object initially at rest explodes into three fragments. The momentum vectors of the two fragments are shown. Draw the momentum vector  $p_3$  of the third fragment.



15. A 500 g ball traveling to the right at 8.0 m/s collides with and bounces off another ball. The figure shows the momentum vector  $p_1$  of the first ball after the collision. Draw the momentum vector  $p_2$  of the second ball.



16. A 500 g ball traveling to the right at 8.0 m/s collides with and bounces off another ball. The figure shows the momentum vector  $p_1$  of the first ball after the collision. Draw the momentum vector  $p_2$  of the second ball.

