

## 2D (Projectile Motion) Test Review

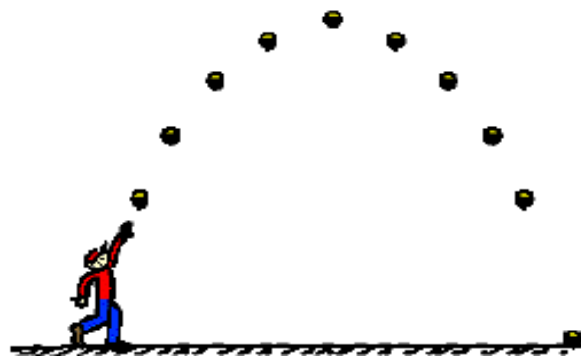
Assume all questions are on Earth and air resistance is zero.

Name \_\_\_\_\_

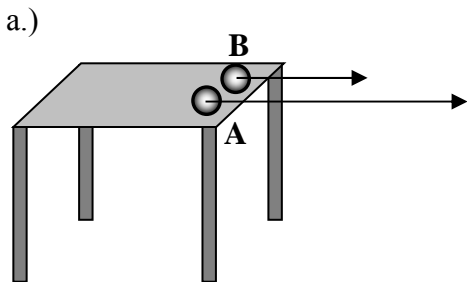
.Date \_\_\_\_\_ Pd \_\_\_\_\_

1. You throw a ball up..
  - a. At each of the data points in the drawing, label the vertical and horizontal velocity vectors.
  - b. In the space below, draw a force diagram for the ball during its trajectory when it is...
  - c. Where is the vertical velocity zero? Circle that dot.

On the way up      At the peak      On the way down

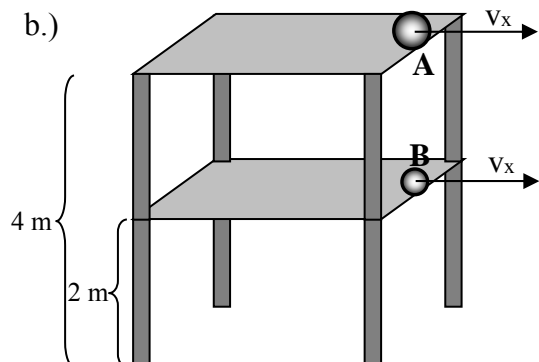


2. You drop a tennis ball from the roof of Irondale. How fast will it be going after 1 second? 2 seconds?
3. A potato is shot straight up from a sling shot (why not?) at 30 m/s. What is its velocity 2 seconds later? 3 seconds later? (you can approximate free fall acceleration as  $-10\text{m/s}^2$ )
4. A toy rocket is launched straight up at 80 m/s. When it returns to starting position, will its speed be:
  - a) greater than 80 m/s
  - b) less than 80 m/s
  - c) equal to 80 m/s
  - d) depends on time
5. Examine the following diagrams and answer the questions for each.



Two marbles of equal mass, A and B, are launched off a table. Marble A has twice the horizontal velocity.

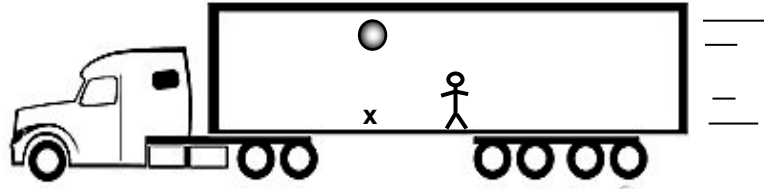
Which marble will hit the floor first?  
Which marble will travel farther?  
Why?



Marble A has twice the mass of Marble B.  
Marble A is launched from twice the height as Marble B.  
They are launched at the same horizontal velocity.

Which marble will hit the floor first?  
Which marble will travel farther?  
Why?

6. A semi trailer drives at a constant velocity of 60 mi/hr. Inside the trailer, a ball is held directly above an “x” painted on the floor and dropped.
- a.) Where will the ball land? Why?



- b.) What kind of a trajectory (shape) would the person inside the trailer see the ball follow? Why?
- c.) A person with x-ray vision is standing on the side of the road watching this happen. Where would this person see the ball land? Why?
- d.) What kind of trajectory (shape) would this person see the ball follow? Why?

7. You throw a rock straight out from a 15 m high cliff. The rock lands 40 m from the base of the cliff.
- a.) Draw the rock’s trajectory and label the picture with its  $\Delta x$  and  $\Delta y$  values.
- b.) Starting at  $t=0$ , draw several data points at equal intervals of time along the rock’s trajectory.
- c.) At each data point, sketch the  $v_x$  and  $v_y$  vectors, as needed.



- d.) How long did it take the rock to hit the water?
- e.) How fast was the rock thrown?