

**Physics 3**  
**Fall 2009**  
**Assignment 2**  
**Due: in class Wed. 16 Sept**

Read: Ch. 4

Probs: Ch. 3:48, 52, 54, 66,79 (a challenge), 84

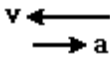
**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

1) Shown here are the velocity and acceleration vectors for an object in several different types of motion. In which case is the object slowing down and turning to the right? 1) \_\_\_\_\_

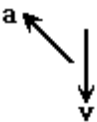
A)



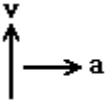
B)



C)

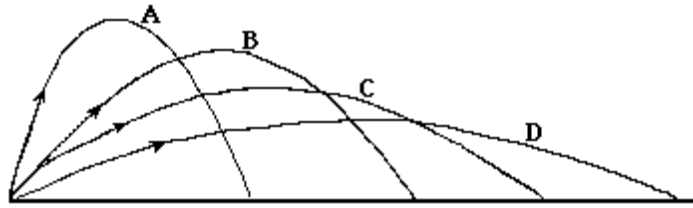


D)



E)





- 2) Shown in the figure are the trajectories of four artillery shells. Each was fired with the same speed. Which was in the air the longest time? 2) \_\_\_\_\_
- A) A
  - B) B
  - C) C
  - D) D
  - E) All were in the air for the same time.

- 3) Which of the following ideas is helpful in understanding projectile motion? 3) \_\_\_\_\_
- A)  $v_x^2 + v_y^2 = \text{constant}$ .
  - B) The velocity of the object is zero at the point of maximum elevation.
  - C) Acceleration is  $+g$  when the object is rising and  $-g$  when falling.
  - D) The horizontal motion is independent of the vertical motion.
  - E) In the absence of friction, the trajectory will depend on the object's mass as well as its initial velocity and launch angle.

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

- 4) Two identical projectiles are launched with equal speeds from the top of a building and feel no air resistance. Projectile A is launched above the horizontal while projectile B is launched below the horizontal. Both projectiles have exactly the same acceleration while they are in the air. 4) \_\_\_\_\_
- 5) A grasshopper leaps into the air at a 62-degree angle above the horizontal. At its highest point, the grasshopper's velocity and acceleration are equal to zero. 5) \_\_\_\_\_
- 6) You throw a 5.0-kg stone from the top of a cliff with an initial vertical velocity of 8.0 m/s downward and an initial horizontal velocity of 7.0 m/s away from the cliff, and it feels no air resistance. After the stone is in the air but free of your hand, its acceleration remains constant at  $9.8 \text{ m/s}^2$  downward, but its speed changes. 6) \_\_\_\_\_
- 7) You can launch a projectile with a fixed initial speed except at any angle above the horizontal, and it feels no air resistance. The time for it to return to the ground does not depend on the angle at which you launch it. 7) \_\_\_\_\_