

## **Acceleration Problems I**

### *Physical Science and Technology*

Instructions: Please complete these problems on your own sheet of paper – write your name, today's date, and the title of this assignment ("Acceleration Problems 1") at the top of your page. For each of these problems, use the Five Steps unless indicated otherwise.

1. **(Challenge Problem)** Sam the Snake is driving her derby racer East across a parking lot. She gently runs over some candy bars that are piled up in the parking lot. For five seconds after running over the candy, Sam accelerates at a rate of  $0.56 \text{ m/s}^2$  to the West. At the end of the five seconds, Sam's velocity is  $14.8 \text{ m/s}$  to the East. What was Sam's velocity right after she ran over the candy bars?
  
2. Nottie the Dalmatian pushes a derby racer off a cliff. At the instant it begins its fall, the derby racer is motionless - its velocity is  $0 \text{ m/s}$ . After 10 seconds, its velocity is  $98 \text{ m/s}$  straight down. What was its acceleration?
  
3. Flappiness the Robin drops a pumpkin onto Peanut's new derby racer. At first, Flappiness is holding the pumpkin motionless – its velocity is  $0 \text{ m/s}$ . After Flappiness lets go, the pumpkin accelerates at a rate of  $7.8 \text{ m/s}^2$  straight down for 1.2 seconds before landing on the derby racer. What is the pumpkin's velocity right before it hits the racer?
  
4. Peanut the Miniature Elephant is running North down the street at  $7.5 \text{ m/s}$ . He sees a free derby racer on the road ahead of him and starts sprinting towards it. After accelerating at  $0.46 \text{ m/s}^2$  for a short period of time, he is running at  $9.1 \text{ m/s}$  to the North. For how long was Peanut accelerating?
  
5. **(Challenge Problem)** A derby racer is rolling down a straight track at  $1.35 \text{ m/s}$ . The derby racer's speed does not change. Is the derby racer accelerating? Explain your answer in words; you do NOT need to use the Five Steps for this problem.