Phys 2010 (NSCC), Fall 2005
Problem Set #3

Unless stated otherwise, problems take place on the surface of the earth, where $g = 9.8 \frac{m}{s^2}$.
Ignore air resistance.

1. A ball is thrown upward with a speed of $25 \frac{m}{s}$. How long does it take to reach maximum height?

2. What is the maximum height attained by the ball in problem 1?

3. A rock is *thrown downward* from a cliff of height 100 m. It strikes the ground below 3.00 s later. With what speed was it thrown?

4. What was the speed of the rock in problem 3 at the time of impact?

5. On a strange planet, an astronaut throw a rock upwards with an initial speed of $30.0\,\frac{m}{s}$. The rock reaches maximum height 3.85 s later.

What is the value of g on this planet?

6. In problem 5, what was the maximum height attained by the rock?

7. A spacecraft moving in outer space is moving with a speed of $5.00 \, \frac{m}{s}$ in the $+x$ direction. Its rockets give it a constant acceleration with components $a_x = +2.00 \, \frac{m}{s^2}$ and $a_y = +1.50 \, \frac{m}{s^2}$. The rockets fire for 4.0 s.

Find the final velocity components and the speed of the craft after the 4.0 s.

8. In problem 7 find the x and y displacements of the spacecraft for the 4.0 s period.