

## QuizNumber2, Math 210, Spring 2016

1. (a) Given the vectors  $\vec{v} = \langle 1, 2, 3 \rangle$  and  $\vec{w} = \langle 1, 1, 1 \rangle$ , find the area of the parallelogram spanned by  $\vec{v}$  and  $\vec{w}$  in three-space.

(b) For the vectors in part (a), find the vector projection of  $\vec{v}$  on  $\vec{w}$  and find the length of the projection of  $\vec{w}$  on  $\vec{v}$ .

2. A ball of mass  $m$  is initially at the point  $(1, 1)$  in the plane and is subject to a gravitational force of  $\langle 0, -mg \rangle$ . The ball is given an initial velocity  $\langle \cos(\pi/4), \sin(\pi/4) \rangle$ . Here  $g = 32 \text{ ft/sec}^2$ , and the velocity components are in  $\text{ft/sec}$ .

Find the maximal value for the height (second coordinate) of the ball, the time for the maximum height, the coordinates of the position point of the ball for the maximum height, and the distance traveled by the ball from its initial position to the new position when it attains this maximal height.