RECITATION 3

1) A stone is thrown straight upward from the edge of the top of a building at an initial speed of 10 *m/s*. How much later must a second stone be dropped from rest at the same initial height of 10 *m* so that the two stones hit the ground at the same time?

2) The coordinates of a particle moving in an *xy* plane are; $x(t) = 3t - 4t^2$ *(m)*, $y(t) = -6t^2 + t^3$ *(m)*. Find;

a) The position vector of the particle at any time,

b) The position vector of the particle over the first 3 *s*,

c) The average velocity vector of the particle over the first 3 *s*,

d) The instantaneous velocity vector of the particle at $t = 3\,s$,

e) The average acceleration vector of the particle over the first 3 *s*,

f) The instantaneous acceleration vector of the particle at $t = 3\,s$.

3) A ball is thrown from the ground into the air at a certain angle. If at a height of 3 *m*, the velocity is $\vec{v} = 4\hat{i} + 3\hat{j}$ *(m/s)* ;

a) Find the velocity of the ball and the angle of projection of the ball,

b) What is the maximum height reached by ball?

c) What is the horizontal displacement of the ball?

d) What is the ball's time of flight?