Task. A person sitting on the top of a tall building is dropping ball at regular intervals of one second. Find the positions of 3rd, 4th and 5th ball when the 6th ball is being dropped.

Solution. Notice that there is a gravitation force acting on a ball so that it moves with a constant acceleration $g = 9.8\ m/s^2$. Moreover, its initial velocity is zero. Therefore if the ball is dropped at tme t_0, then the distance from the top of the building to the ball at time t is given by the following formula:

$$h(t) = \frac{g(t - t_0)^2}{2}.$$

Assume that 3-rd ball is dropped at time $t_3 = 0$ s. Then 4-th ball is dropped at time $t_4 = 1$ s, 5-th ball at time $t_5 = 2$ s, and 6-th ball at time $t_6 = 3$ s.

Therefore the distance from the top of the building to the 3-rd ball at time $t_6 = 3$ s is

$$h_3(t_6) = \frac{g(t_6 - t_3)^2}{2} = \frac{9.8 * (3 - 0)^2}{2} = 44.1\ m.$$

Similarly, the distance from the top of the building to the 4-rd ball at time $t_6 = 3$ s is

$$h_4(t_6) = \frac{g(t_6 - t_4)^2}{2} = \frac{9.8 * (3 - 1)^2}{2} = 19.6\ m,$$

and the distance from the top of the building to the 5-rd ball at time $t_6 = 3$ s is

$$h_5(t_6) = \frac{g(t_6 - t_5)^2}{2} = \frac{9.8 * (3 - 2)^2}{2} = 4.9\ m.$$