PHYS 204-Section 03
Mechanics - Fall 2017
Assignment 2
Due date: Sep. 27th (Submit in class)

---

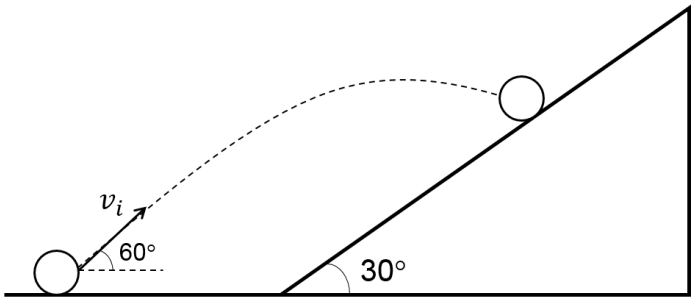
1. An object moves from $\vec{r}_i = (2\hat{\imath} + 3\hat{\jmath})\ m$ to $\vec{r}_f = (-2\hat{\imath} - \hat{\jmath})\ m$ during 4 seconds. If the constant acceleration of the particle during this 4 seconds is $\vec{a} = (-\hat{\imath} + \hat{\jmath})m$, determine:
   a) Its initial velocity **(2 marks)**
   b) Its final velocity **(2 marks)**

---

2. A projectile is launched from the ground level and lands on the ground. If the range of the projectile is twice its maximum height, find the launch angle.
   (3 marks)

---

3. A projectile is launched with $v_i = 20\frac{m}{s}$, at an angle of 60° above horizon at a horizontal distance of 2 m from the base of an inclined surface with $\alpha = 30°$ (see the figure below). What is the coordinate of the landing point on the inclined surface? (take $g = 10\frac{m}{s^2}$)
   a) *x*-coordinate? **(2 marks)**
   b) *y*-coordinate? **(2 marks)**



---

4. The velocity of an object is described by: $\vec{v}(t) = (2t\,\hat{\imath} - t^2\,\hat{\jmath})\frac{m}{s}$, determine the average acceleration between t = 1 s and t = 3 s **(2 marks)**

---

5. James Bond is driving his Aston Martin with speed of 40 m/s as he flies off a 100 m building, hoping to land on an 80 m building that is 100 m away (see the figure below). Take g = 10 m/s^2.

a) Determine the ***coordinates*** of his landing point (or crashing to the building). **(2 marks)**

b) What is his ***velocity*** when he lands (or crashes)? **(2 marks)**