1. The acceleration of a particle is directly proportional to the time $t$. At $t = 0$, the velocity of the particle was 0.4 m/s. Knowing that $v = 0.37$ m/s and $x = 0.5$ m when $t = 1$ s, determine the velocity, position and total distance traveled when $t = 7$ s.

2. Two rockets are launched at a fireworks performance. Rocket A is launched with an initial velocity $v_0$ and rocket B is launched 4 s later with the same initial velocity. The two rockets are timed to explode simultaneously at a height of 80 m, as A is falling and B is rising. Determine (a) the initial velocity $v_0$, (b) the velocity of B relative to A at the time of the explosion.

3. A ski jumper starts with a horizontal take-off velocity of 25 m/s and lands on a straight landing hill inclined at 30°. Determine (a) the time between take-off and landing (b) the length $d$ of the jump (c) the maximum vertical distance $h$ between the jumper and the landing hill

4. Knowing that A starts from rest and moves downward with a constant acceleration of 3 m/s$^2$, determine (b) the velocity and acceleration of B after 2 seconds (c) the change in position of B after 2 seconds