Solve the following problems using your kinematics equations and knowledge of 1-D motion. Include diagrams, given information, formula, etc. as part of your complete solution. You may need to work on a separate piece of paper to show your full solutions.

1. A flower pot resting on a window sill on the third floor of a building is blown off by the wind. Each floor is 3 m in height.
    a. When is the flower pot half way to the ground?
    b. When does the flower pot hit the ground?
    c. What is the velocity of the flower pot the instant before it strikes the ground?

    d. To make this a 2-D problem, we can say the flower pot was pushed off the ledge with an initial horizontal velocity of 1.5m/s.

        i. Does this horizontal velocity change any of the previous calculations?

        ii. How far from the base of the wall does the flower pot land?

        iii. What is the Resultant velocity (mag. and direction) of the flower pot right before impact?

2. A water propelled rocket is launched from a two metre high platform. The initial velocity of the rocket is 45m/s.
    a. What is the maximum height achieved by the rocket?
    b. When does the rocket reach its maximum height?
    c. What is the total flight time, when the rocket is back at its original launch height?
    d. What is the total flight time, when the rocket hits the ground?

    e. To make this a 2-D problem, we can say the rocket had an initial horizontal velocity of 20m/s.

        i. Does this horizontal velocity change any of the previous calculations?

        ii. What is the Resultant velocity (mag. and direction) of the rocket at the BEGINNING of the problem?

        iii. What is the range of the rocket when it hits the ground?