

Applications of Quadratic Functions:

1. If the flight of an object is defined by the equation $y = -16x^2 + 64x$ where y represents distance and x represents time, determine the following:
 - a) the time at which the object reaches its maximum height
 - b) the maximum height the object reaches
 - c) the time it takes for the object to reach the ground
 - d) sketch the graph of the equation (use appropriate scale)

2. Use the following equation to solve the problems posed below:

If an object is thrown vertically upwards with a starting speed of v meters per second, from an altitude of h meters, then the height y after x seconds is given by $y = -4.9x^2 - vx + h$

- a) A ball is thrown upward with a velocity of 14.7 m/s by a person 1.4 m tall.
 - 1) What is the maximum height reached by the ball?
 - 2) How long does it take for the ball to reach a maximum height?
 - 3) How long is the ball in the air before it strikes the ground?

 - b) A missile is fired vertically with a velocity of 2450 m/s from a base 500 m above sea level.
 - 1) What is the maximum height reached by the missile?
 - 2) How long does it take to reach the maximum height?
 - 3) How long will it be before the missile descends to an altitude of 500 m above sea level?

 - c) A diver jumps from a tower 30 m above the water with a velocity of 4.9 m/s. How long does it take for the diver to reach a point 0.6m above the water?
3. A pilot was crop dusting in his single engine plane at an altitude of 50 m when the propeller fell off. The height, h , of a falling object is given by $h = A - 4.9t^2$ where A is the initial height of the object and t is the time elapsed.
 - a) How far above the ground is the propeller after 3s?
 - b) Will the propeller have hit the ground after the fourth second?

 4. During a stunt, the power dive of a plane is given by the equation, $h = t^2 - 10t + 80$ where h (in meters) is the height of the plane after time t (in seconds)
 - a) Draw a graph of the path of the plane.
 - b) How high is the plane at the start of the dive?
 - c) How high above ground level is the plane at its minimum point?