

**Math 3206**  
**Worksheet 2**  
**Maximum and Minimum Problems Given the Function**

- 1 A football follows a path defined by  $h(t) = -t^2 + 6t$  where  $h$  is height in metres and  $t$  is time in seconds.
- A) What kind of vertex will the graph have? \_\_\_\_\_
- B) Find the height of the football after 4.0 s? (Substitute 4.0 s into “t” and solve for h(t).)
- C) Find the vertex of the parabola.
- D) At what time, in seconds, does the football reach its maximum height? \_\_\_\_\_
- E) What is the maximum height reached by the football? \_\_\_\_\_
- 2 The path of a model rocket launched into the air is modeled by the function  $h = -4.9t^2 + 196t$ , where  $h$  is height in metres and  $t$  is elapsed time in seconds.
- A) Find the height of the rocket after 5.0 s? (Substitute 4.0 s into “t” and solve for h(t).)
- B) Find the vertex of the parabola.
- C) At what time, in seconds, does the rocket reach its maximum height? \_\_\_\_\_
- D) What is the maximum height reached by the rocket? \_\_\_\_\_
- 3 A toy rocket is launched from the top of a building so that its height,  $h$ , in metres, above the ground  $t$  seconds later is given by  $h(t) = 30 + 64t - 16t^2$ .
- A) What is the height of the building from which the rocket was launched? (i.e. Find the initial height of the rocket.)

B) Find the vertex.

C) At what time, in seconds, does the rocket reach its maximum height? \_\_\_\_\_

D) What is the maximum height reached by the object? \_\_\_\_\_

4 A cannonball is fired and its height,  $h$ , in metres, above the ground,  $t$  seconds after being fired, is given by  $h(t) = -5t^2 + 40t + 3$ .

A) What is the initial height of the cannonball above the ground?

B) Find the vertex.

C) At what time, in seconds, does the cannonball reach its maximum height? \_\_\_\_\_

D) What is the maximum height reached by the object? \_\_\_\_\_

5 A person diving from platform has their height above the water,  $h$ , in metres,  $t$  seconds after diving, given by:  $h(t) = -4t^2 + 4t + 10$ .

A) What is the height of the platform?

B) Algebraically determine the by the maximum height attained diver and the time taken to reach this height. (ie. Find the vertex and interpret it.)

6 A skier decides to jump a ramp. The path of the jump can be represented by the quadratic relationship  $h(t) = -6t^2 + 12t + 1$  where  $h$  represents the height above the ground in metres, and  $t$  represents time after leaving the ramp in seconds. Algebraically determine the maximum height reached by the jumper and the time at which this maximum height occurs. (ie. Find the vertex and interpret it.)