Lesson 5: Applications of Quadratic Functions

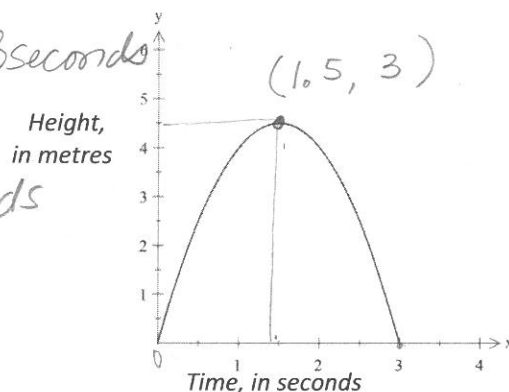## Example 1: Quadratic Application with Graph Given

A ball is kicked into the air. The graph below shows the height of the ball versus time.

a) How long (how many seconds) is the ball in the air? *3 seconds*

b) What is the maximum height attained? *4.5 m*

c) How long does it take the ball to reach its maximum height? *1.5 seconds*

d) What is the minimum height of the ball? *0 m*

(1.5, 3)

Height, in metres

Time, in seconds

Example 2: Quadratic Application with Equation Given

You are playing golf on the Moon. You hit a ball with your golf club. The height of the ball, H, in metres, with respect to time, t, in seconds, can be modelled by the equation

$$H = -0.8t^2 + 40t$$
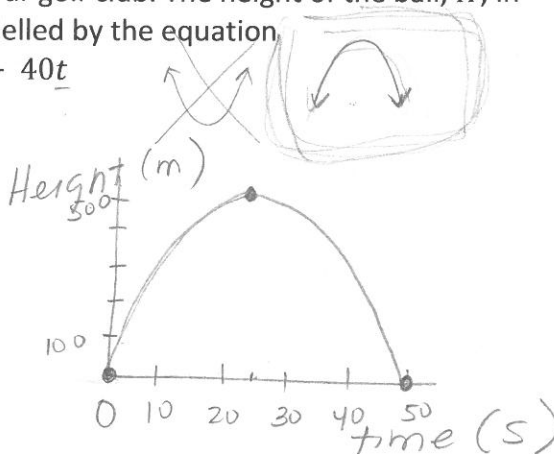
a) Sketch the graph. Show the vertex and intercepts.

(25, 500)

Height (m)

500

100

0 10 20 30 40 50 time (s)

b) What is the maximum height of the ball?

500 m

c) How long (for how many seconds) was the ball in the air?

50 seconds

Example 3: Quadratic Application with Equation Given

A water arch at a splash pad is defined by the following function:
$$V = -0.15x^2 + 3x$$
Where x represents the horizontal distance, in feet, from the opening in the ground, and V represents the vertical distance, in feet.

a) What is the maximum height of the arch of the water?

$$x = 10 \qquad y = 15$$

max height 15 ft.

b) How far from the opening in the ground can the water reach?

20 ft.

Example 4: Quadratic Application with Table of Values Given

a) An archway is parabolic in shape. Some measurements taken from the archway are shown in the table below. Determine the quadratic regression equation.

Horizontal Distance (ft)	0	2	4	6
Height (ft)	0	8.59	9.38	2.34

$$y = -0.98x^2 + 6.25x - 0.0015$$

b) What is the maximum height of the archway?

10.00 ft

c) What is the minimum height?

0 ft

d) How wide is the archway at ground level?

6.40 ft