Chapter 7

Section 7.8 – Applications of Quadratic Functions Maximization Problems

Quadratic Functions

Name:		Date:
	alloween wigs at \$20 each, every mo What is the price that would maxir	
a. Make a function to mo	odel the situation.	
b. Factor the function an	nd find the zeros; what do the zeros	represent?
c. Find the vertex of the	function you made in part a). What	t does this represent?

Maximization Problems

Example In the (North American) football, a field goal can be scored by kicking the ball between the goal posts in the opponents end zone. For a kick in a particular game, the height of the ball above the ground, y, in metres, can be modelled by the function

$$y = -4.9x^2 + 25x$$

where x is the time in seconds after the ball left the foot of the player.

I decimal place

a. Determine the maximum height that this kick reached, to the nearest tenth of a metre.

Step 1: Factor
$$y = -4.9 \times (\times -5.1)$$

Step 2: Find zeros

$$\chi = 0$$
 $\chi = 5.1 = 0$
 $\chi = 5.1$

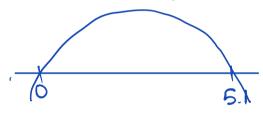
$$y = -4.9(2.55)^{2} + 25x$$

$$= -31.9 + 63.75$$

$$= 31.85$$

$$= 31.9 \text{ m}$$

b. State any restrictions that the context imposes on the domain and range of this function.



Domain: 0<25.1

c. How long was the ball in the air?

5.1 seconds.