59 (a) A line graph of the data is shown in *Figure 59.* The height begins to decrease after 4 seconds. The object appears to have been dropped after 4 seconds.

(b) During the first 4 seconds, when the object is being lifted, the height could be modeled with a linear function. After four seconds, when the object begins to fall, the height can be modeled with a nonlinear function.

$[-1, 8, 1]$ by $[-10, 170, 10]$

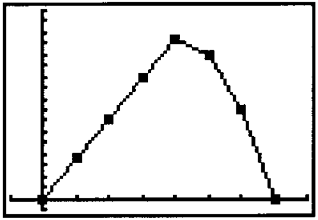

Figure 59

(c) The altitude increases by 36 feet each second, during the first four seconds. Therefore, let $m = 36$. When $x = 4$, the height is 144 feet. Let $b = 144$. Since when $x = 7$, the height was 0, $a(7-4)^2 + 144 = 0 \Rightarrow a = -16$. Thus,

$$f(x) = \begin{cases} 36x, & \text{if } 0 \le x \le 4 \\ -16(x-4)^2 + 144, & \text{if } 4 < x \le 7 \end{cases}$$