1. Use the function $h(t) = -16t^2 + v_o t + s$, where v_o is the initial velocity, s is the initial height, t is time in seconds, and $h(t)$ is the height after t seconds have elapsed.

The fraternities at Steele Head University are participating in a blanket toss competition. if the person being tossed is traveling at 32 ft/sec as he is projected into the air, and the frat brothers are holding the canvas at a height of 5 feet,

a) write the function that models the height at time t of the person being tossed.
b) how high is the person at $t = 0.5$
c) how high is the person at $t = 1.5$
d) when would the maximum height be reached? (round to the nearest tenth)
e) what is the maximum height, to the nearest foot?

a) $h(t) = -16t^2 + \underline{\underline{32t}} + \underline{\underline{5}}$

b) $h(.5) = -16(.5)^2 + 32(.5) + 5 = -16 \cdot \frac{1}{4} + 16 + 5 = 17$ feet

c) $h(1.5) = -16\left(\frac{3}{2}\right)^2 + 32\left(\frac{3}{2}\right) + 5 = -16 \cdot \frac{9}{4} + 32 \cdot \frac{3}{2} + 5 = 17$ feet

d) $t_{max} = -\left|\frac{32}{2(-16)}\right| = 1$ seconds

e) $h(1) = -16 + 32 + 5 = 21$ feet

2. A convenience store owner sells 20 oz soft drinks for 1.50 each, and sells an average of 500 per week. Using market survey, she believes that for each 0.05 decrease in price, an additional 25 soft drinks would be sold.

Let x be the number of 5 cent decreases made
a) Write a function to calculate Revenue
b) What price should be charged to maximize the revenue
c) What is the maximum revenue?
d) What is the lowest price the owner should charge for a soft drink and still bring in at least $700 per week in revenue?

Revenue = # of drinks sold • price per drink

a) $R(x) = (\underline{\underline{500}} + 25x)(\underline{\underline{1.50}} - .05x)$

Original ↑ Price change

$R(x) = 750 + 25x + 37.5x - 1.25x^2$

$R(x) = -1.25x^2 + 62.5x + 750$

b) $x_{max} = \frac{-62.5}{2(-1.25)} = 25 \Rightarrow$ decrease price by 5¢ 25 times

$1.50 - .05(25) = .25¢$

c) $R(25) = -1.25(25)^2 + 62.5(25) + 750 = \$281.25$

d) $700 = -1.25x^2 + 62.5x + 750$

$0 = -1.25x^2 + 62.5x + 50$

$0 = x^2 - 50x + 40$

$(x - 10)(x - 40)$

$x = 10 \qquad x = 40 \qquad\qquad x = \cancel{10}$ decreases of 5¢

price $1.00

OR $\qquad\qquad$ ~~40~~ decreases of 5¢ price = 2.00 decrease