# Modeling Quadratics: Do you know how to use your calculator?
Review Target 03   Round all answers to the nearest hundredth.

1. On a fourth down, the Cavs are just out of field goal range. Matt needs to kick the football high and short. This punt can be modeled by $y = -0.065x^2 + 1.2x + 18.5$, where x is the distance (in yards) the football is kicked and y is the height (in yards) the football is kicked.   [-20, 50, 1, -40, 50, 1]

   a. Sketch the graph of the quadratic function and label the axes with the real-world meaning.
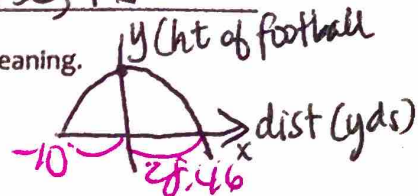
   18.5 yds. (doesn't make sense)

   b. Find the greatest height of the football.   (9.23, 24.04)

   24.04 yards

   ✗ c. When the ball hits the ground, how far is it from where it was kicked?   (28.4615, 0)

   28.46 yards   38.46 !

2. Retail prescription drug sales in the United States increased from 1995 to 2000 as shown in the given table.

   a. Write the equation of the quadratic model that best fits your statistical data.   [-19, 49, 1, -40, 160]

   $y = 1.41x^2 + 7.44x + 68.55$

Years since 1995	Retail Sales (billions of dollars)
0	68.6
2	89.1
3	103.0
4	121.7
5	140.7

   b. Predict what the drug sales will cost in 2015. Is this a valid prediction based upon our data?

   2015 − 1995   x = 20 $781.64 billion $r^2 = .99$

   c. When were the drug sales at the lowest and what was the sales amount at that point?   (-2.64, 58.74)

   In 1992, the sales were 58.74 billion

3. A study compared the speed x (in miles per hour) and the average fuel economy y (in miles per gallon) for cars. The results are shown in the table below.

   a. Write the equation of the quadratic model that best fits your data.

   $y = -.01x^2 + .75x + 13.47$
   $r^2 = .96$

Speed, x	15	20	25	30	35	40
Fuel economy, y	22.3	25.5	27.5	29.0	28.8	30.0
Speed, x	45	50	55	60	65	70
Fuel economy, y	29.9	30.2	30.4	28.8	27.4	25.3

   b. At what speed will the fuel economy be at the maximum amount?   (45.50, 30.44)

   45.50 mph

   c. What is the average fuel economy at that speed?

   30.44 mpg

   d. What will the fuel economy be when the speed is 100 miles per hour?   (100, 6.09)

   6.09 mpg