Name _Key_

1. The number h (in thousands) of hairdressers and cosmetologists in the United States from 1994 to 2001 can be approximated by the model $h = 4.17t^2 - 49.1t + 881$, $4 \leq t \leq 11$ where t represents the year, with $t = 4$ corresponding to 1994. (minimum $x = 5.887$ $y = 736, 467$)

   window
   Xmin = 2
   Xmax = 13
   Ymin = 0
   Ymax = 1000

   a. Using this model, determine the year in which the number of hairdressers and cosmetologists was the least.

   In 1995 there were the least amount of hairdressers + Cosmotoligates.

   b. According to this model, what was the least number of hairdressers and cosmetologists for this time period?

   The least number of hairdressers was ~736 thousand in 1995. 736,467

2. A manufacturer of lighting fixtures has daily production costs of $C = 800 - 10x + 0.25x^2$ where C is the total cost (in dollars) and x is the number of units produced. How many units must be produced each day to yield a minimum cost? (find the minimum)
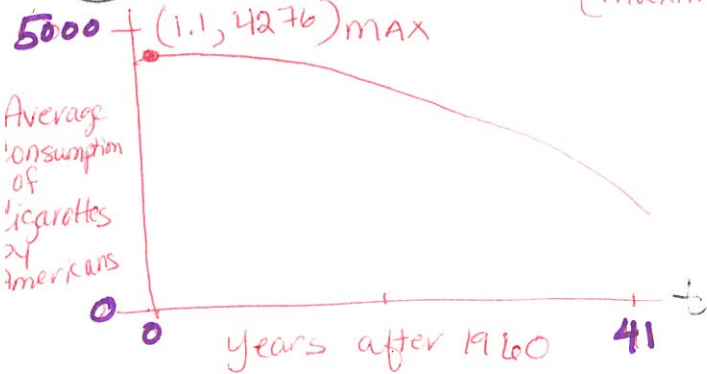
   min (20, 700)

   20 units must be produced each day in order to yield the minimum cost of $700.

3. From 1960 to 2001, the average annual per capita consumption C of cigarettes by Americans (age 18 and older) can be modeled by $C = 4274 + 3.4t - 1.52t^2$, $0 \leq t \leq 41$, where t is the year, with $t = 0$ corresponding to 1960.

   a. Sketch a graph of the model. [maximum: $x = 1.118$ $y = 4275.9$]

   5000 + (1.1, 4276) MAX

   Average consumption of cigarettes by Americans

   0   years after 1960   41

   b. Use the graph of the model to approximate the maximum average annual consumption. Begining in 1966, all cigarette packages were required by law to carry a health warning. Do you think the warning had any effect? Explain.

   The maximum average annual consumption of cigarettes was 4276 in 1961.

   The warning may have had effect because the average consumption seemed to decrease faster.

   c. In 2000, the US population (age 18 and over) was 209,128,000. Of these, about 48,300,000 were smokers. What was the average annual cigarette consumption per smoker in 2000? What was the average daily cigarette consumption per smoker?

   2000, t = 40

   so in 2000 the average consumption was about 1978

   $\frac{1978 (209,128,000)}{48,300,000}$ ✓ 8564 per smoker per year

   $\frac{8654}{365}$ ✓ 23.5 cigarettes per smoker