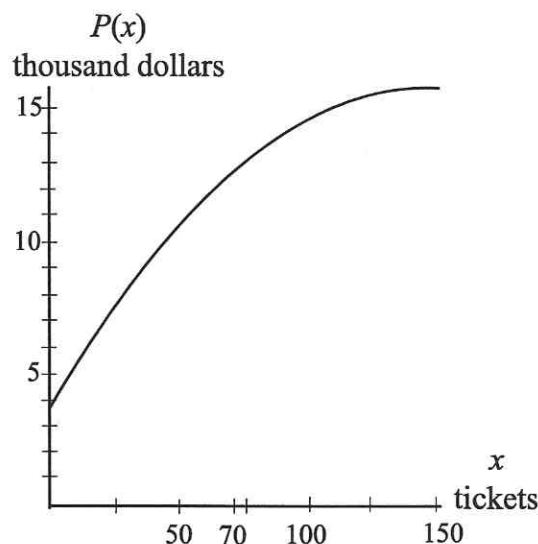


Name: _____
Group Members Present: _____

Grade: _____

_____, _____, & _____

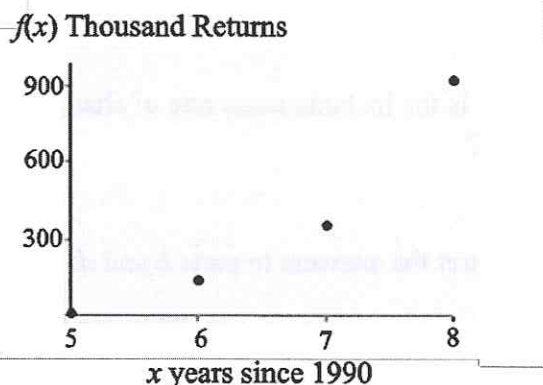
1. A charity organization is trying to decide on the price to charge for tickets to its fall fund-raiser for heart research. The graph shows the estimated profit from the sale of tickets at various ticket prices.
 - a. Draw a line tangent to the graph of P when $x = 70$.
 - b. Use the tangent line to estimate the instantaneous rate of change of P when $x = 70$.



- c. Interpret the result in part b.

2. The table lists the number of tax returns filed by personal computer for 1995 through 1998. The figure shows a graph of this data. (Source: Internal Revenue Service)

Year	Tax returns filed by PC (thousand returns)
1995	1
1996	150
1997	375
1998	942



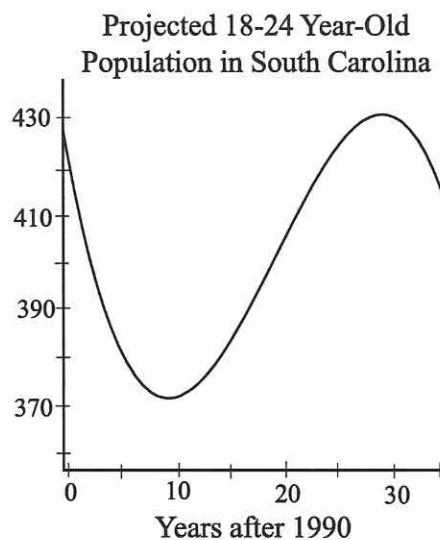
- a. Find a quadratic model to fit the data.
- b. Consider the slopes of continuous model at 1995, 1996, 1997, and 1998. Match the statements in the left column (at the top of page 2) with the points whose inputs correspond to the years listed in the right column. (Hint: View a graph of the model over years from 1994 through 1999.)

The slope of the tangent line is 409,300 PC returns per year.	1995
The instantaneous rate of change is -8700 PC returns per year.	1996
The slope of the graph is 200,300 PC returns per year.	1997
The tangent line is steepest in this year.	1998

3. $P(x) = -0.055x^3 + 2.533x^2 - 32.352x + 490.8$

thousand gives the projected population of 18- to 24-year olds in the state of South Carolina between 1995 and 2025, where x is the number of years since 1990.

- a. Use a tangent line to determine how quickly the 18- to 24-year-old population was changing in 2005.



- b. Interpret the result from part a.
- c. Would a prediction of the 18- to 24-year-old population using the result from part a be an overestimate or underestimate of the population in 2008.
- d. Was the 18- to 24-year-old population changing more quickly in 1996 or 1999?
- e. Draw the line tangent to P at $x = 25$. Calculate and interpret the slope of this tangent line.