Homework Assignment 12: Due at the beginning of class 10/24/01

The table below shows the average annual earnings of full-time, college-educated female workers in 1997[1]. Questions 1, 2 and 3 refer to this information.

Education	Age=18	Age=25	Age=35	Age=45	Age=55
Some college education	15506	24127	28561	31350	29535
College graduate	26297	37321	46154	45105	40203

1. Plot a graph showing the average earnings of women who have graduated from college. What kind of polynomial function would do a good job of representing the trends shown in the data?

2. Find an equation for the average annual earnings of a college graduate as a function of her age.

3. Express the equation that you have found for the income of college graduates in **vertex form**. Use the vertex form of the equation to determine:

- at what age the average female worker (who is a college graduate) achieves her maximum annual earnings, and,
- the maximum annual earnings of the average female worker who is a college graduate.

Controversial state representative Arnold "Mad Dog" Johnson fears that he will not win re-election unless he pleases his wealthy constituents. Mr. Johnson introduces a bill that he says "will not penalize people with the drive and initiative to earn a good living." Specifically, Mr. Johnson's bill proposes the following scheme for state tax:

- If you earn between \$0 and \$20,000, then your state tax is 10% of your taxable income.
- If you earn between \$20,000 and \$40,000, then you pay 10% on the first \$20,000, and 5% on whatever is left over.
- If you earn over \$40,000, then you pay 10% of the first \$20,000, 5% of the next \$20,000, and nothing on the rest.

Questions 4 and 5 refer to this scenario.

4. Sketch a graph showing the state tax that an individual would have to pay versus taxable income.

5. Find a collection of equations that could be used to calculate the amount of tax that an individual will have to pay, based on their taxable income. As part of your answer you should describe the problem domain of each equation.

[1] Source: US Bureau of the Census, *Current Population Reports*.