Long-term Assignment #3   ***Due***_____

27 total points

1) In 2009, the number of people worldwide living with HIV/AIDS was estimated at more than 33.3 million. That number was growing at an annual rate of about 8%.

    a. Make a table showing the projected number of people around the world living with HIV/AIDS in each of the ten years after 2009, assuming the growth rate remains 8% per year. (2 points)

    b. Write two different kinds of rules that could be used to estimate the number of people living with HIV/AIDS at any time in the future. (3 points)

    c. Use the rules from Part b to estimate the number of people living with HIV/AIDS in 2025. (1 points)

    d. What factors might make the estimate of Part c an inaccurate forecast? (1 points)

Long-term Assignment #3   **Due**_____

27 total points

2) The Dow Jones Industrial Average provides one measure of the "health" of the U.S. economy. It is a weighted average of the stock prices from 30 major American corporations. The following table shows the low point of the Dow Jones Industrial Average in selected years from 1965 to 2010.

Year	DJIA Low
1965	841
1970	631
1975	632
1980	759
1985	1,185
1990	2,365
1995	3,832
2000	9,796
2005	10,012
2010	9,686

Source: finance.yahoo.com/9/
hp?s=^DJI+Historical+Prices

a. Find what you believe are the best possible linear and exponential models for the pattern of change in the low value of the Dow Jones Industrial Average over the time period shown in the table (use t = 0 to represent 1965). Then decide which you think is the better of the two models and *explain your choice*.
 (4 points)

b. Use your chosen predictive model form Part a to estimate the low value of this stock market average in 2015 and 2020. *Explain* why you might or might not have confidence in those estimates. (3 points)

c. Some stockbrokers who encourage people to invest in common stocks claim that one can expect an average return of 10% per year on that investment. Does the rule you chose to model increase in the Dow Jones average support this claim? *Why or why not*? (3 points)

Long-term Assignment #3   **Due**_____
27 total points

3) Exponential functions, like linear functions, can be expressed by rules relating x and y values and by rules relating NOW and NEXT y values when x increase in steps of 1. Compare the patterns of (x,y) values produced by these functions: $y = 2(3^x)$ and $y = 2 + 3x$ by completing these tasks.

      a. For each function, write another rule using NOW and NEXT that could be used to produce the same pattern of (x,y) values. (3 points)

      b. How would you describe the similarities and differences in the relationships of x and y in terms of their function graphs, tables and rules. (3 points)

4) Exponential functions, like linear functions, can be expressed by rules relating x and y values.

      a. In exponential functions with rules $y = a(b^x)$:

          i. How does the value of a affect the graph? (1 points)

          ii. How does the value of b affect the graph? (1 points)

      b. In linear functions with rules $y = a + bx$:

          i. How does the value of a affect the graph? (1 points)

          ii. How does the value of b affect the graph? (1 points)