MAT 105 Quiz 3.1-3.4 (white) Fall 2009 Name _____

Problems	1	2	3	4	Total		Grade
Points						%	
Out of	16	12	12	10	50		

Relax. You have done problems like these before. Even if these problems look a bit different, just do what you can. If you're not sure of something, please ask! You may use your calculator. Please show all of your work and write down as many steps as you can. Don't spend too much time on any one problem. Please leave the following grading key blank for me to use. Do well. And remember, ask me if you're not sure about something. A few formulas from our book:

Percentage Change Formula

To get the result of increasing an amount by $r\%$, multiply by $1 + \frac{r}{100}$.

To get the result of decreasing an amount by $r\%$, multiply by $1 - \frac{r}{100}$.

The Growth Factor Formula

If an amount is growing exponentially and the amount changes from from P to A in T time periods, then the growth factor g is given by the formula

$$g = \left(\frac{A}{P}\right)^{\left(\frac{1}{T}\right)}$$

1. (a) Write in standard scientific notation: 34,298,000,000,000,000,000

(b) Use your answer from the previous problem to approximate log(34,298,000,000,000,000,000) *Explain your reasoning.*

(c) Calculate $1.52^{1/900}$. Please report your answer to 5 decimal places.

(d) Calculate $\dfrac{4.65 \times 10^{-17}}{9.20 \times 10^{45}}$

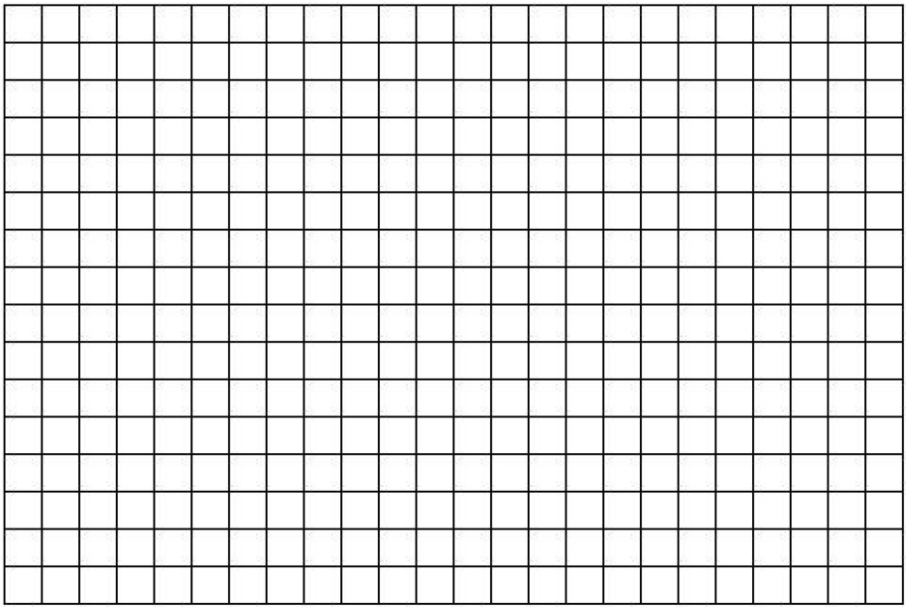
(e) Use your answer from the previous problem to calculate $\log\left(\dfrac{4.65 \times 10^{-17}}{9.20 \times 10^{45}}\right)$. Please report your answer to 5 decimal places.

2. I decided to put some of my savings in a CD (Certificate of Deposit) account to make some extra money. The CD will pay 1.15% per month in dividends. This sounds like a good investment to me and so I scraped together \$800 to deposit. The value V of my investment after M months, therefore, is given by the formula:

$$V = 800(1.0115)^M$$

(a) Make a table showing my investment's projected value now, after one month, six months, twelve months, and twenty-four months later.

(b) Make a graph illustrating the dependence. *Scale your axes to start the time at 0 months and the value of the account to be \$800. Be sure to extend the horizontal axis to include 24 months.*



(c) I plan on using this money to purchase a new flat screen TV that costs \$1000. How long will I have to wait? *Use successive approximations to answer the question to the nearest month. Display your work in a table.*

3. The economic recession has a huge impact on the retail sector. The department store Macy's reported total sales have decreased. In January of 2009, Macy's made $17 billion in sales. Nine months later, sales dropped to $15.6 billion.

   (a) Calculate the monthly *growth factor*, assuming Macy's sales have decreased exponentially.
   Test-taking tip: write down what you plugged into your calculator.

   (b) On average, by what *percentage per month* are sales decreasing?

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4. Hard drive disk drive storage capacity has been growing exponentially. In 1995, hard drives could only hold 1 gigabyte of information. At that time it was estimated that storage capacity would grow 80% per year.

   (a) Name the variables including units. Which one is dependent and which one is independent?

   (b) Assuming the growth is exponential, write down an equation that describes the dependence.

   (c) Fourteen years later in 2009, hard drives can hold 10,000 gigabytes of information. Is that storage capacity higher or lower than predicted from your equation? Explain.