MAT 105 Exam 1 (gray) Summer 2010   Name _____

Problems	1	2	3	4	5	Total		Grade
Points							%	
Out of	12	32	32	14	10	100		

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. Always remember to report the units on an answer. Do well. And remember, ask me if you're not sure about something.

A few formulas from our book:

Root Formula:
A solution of the equation $B^n = k$ is $B = k^{1/n}$.

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

1. Video Casette Recorders (VCRs) used to be common in many households. The graph below shows the percentage of households with a VCR (H, units of percentage) Y years from 1978. Use the graph to answer the following questions.
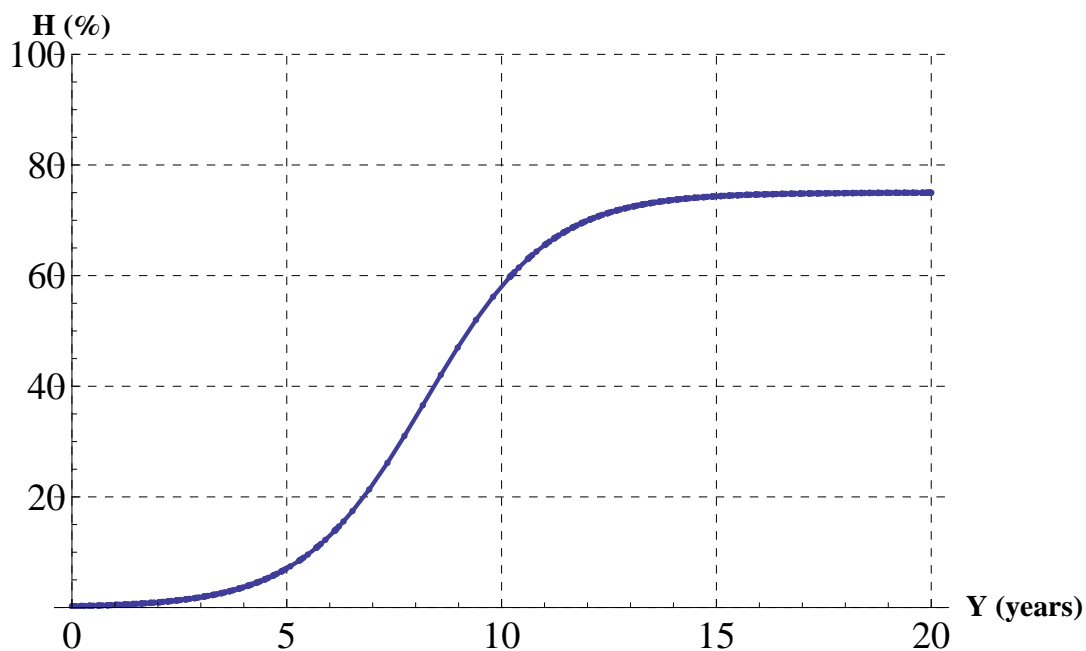
(a) What percentage of households had a VCR in 1983 (5 years from 1978)?

(b) Does this graph show a dependency that is increasing, decreasing, or neither?

(c) Approximately in what year did the number of households with a VCR exceed 50%?

(d) This graph only shows data to 1998. If the graph continued to 2009, what do you think it would look like? Describe your reasoning with a sentence or two.

2. To purchase stamps at my ATM there is a $0.75 convenience fee. Each stamp costs 42 cents.

   (a) Make a table showing the cost to buy 5 stamps, 10 stamps, and 20 stamps from the ATM.

   (b) Name the variables, including units, and write an equation illustrating the dependence.

   (c) My wife bought stamps from the ATM and it cost her $13.35. Solve your equation to determine how many stamps she bought. *If you cannot solve the equation, you may show some other method of finding the answer for possible partial credit.*

   (d) Draw a graph showing how the cost of buying stamps changes with the number of stamps purchased.
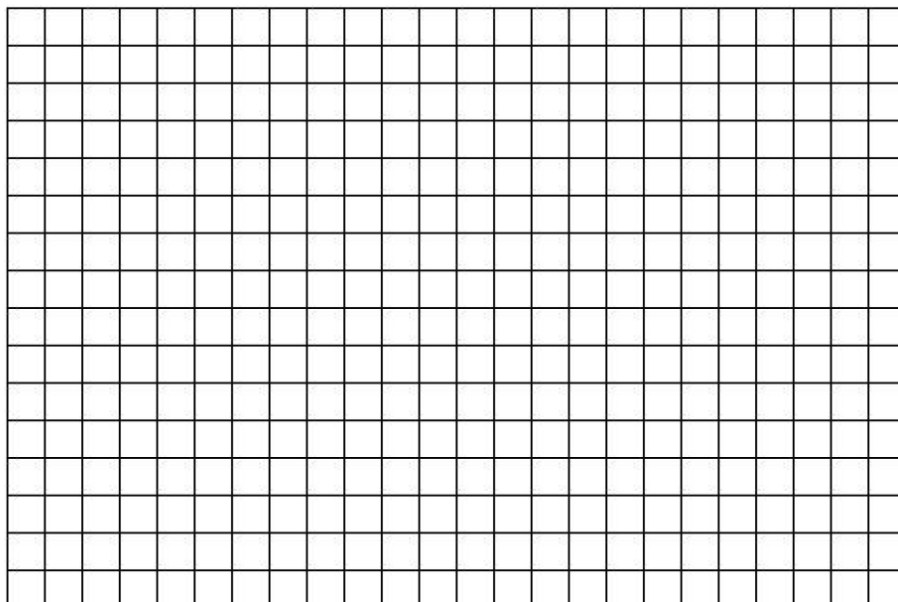
3. In 2005, the Worldwatch Institute estimated that world poultry production was growing at a rate of 1.6% per year. In 2005, poultry production was at 78 million tons.
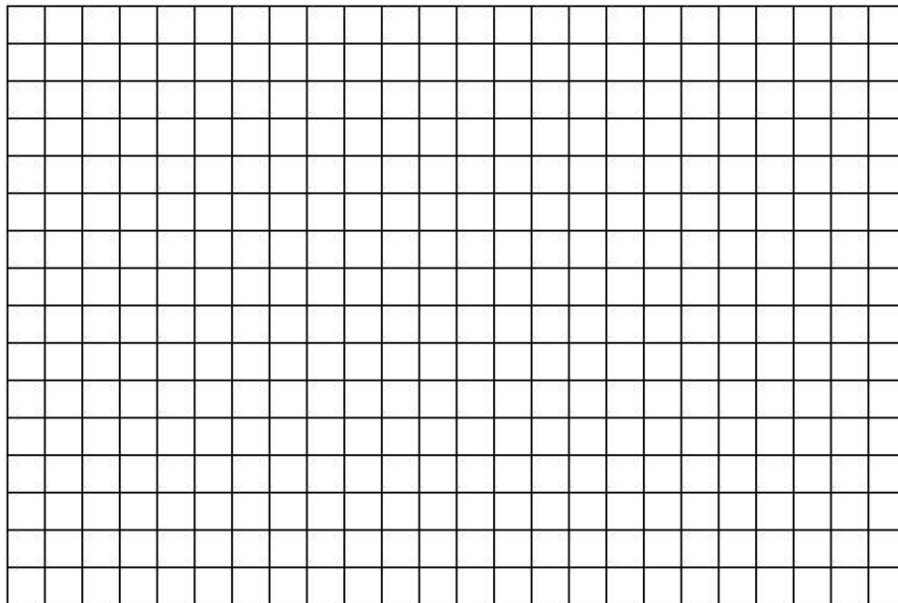
   (a) Write an equation illustrating this dependence using the following variables:

   P = poultry production (measured in millions of tons)

   Y = year (measured in years since 2005)

   (b) Make a table showing the production in 2005, 2010, 2015, and 2020. Please report your answer to the first decimal place.

   (c) Draw a graph showing how production will change in the future.

   (d) Use successive approximations to predict when the production will rise above 95 million tons. Please report your answer to the first decimal place. *Display your work in a table. Answer to the nearest year. Be sure to say the actual year.*

4. Every winter, ice forms on the lake near my house. After the temperature is consistently below freezing, the ice thickness continually grows. Sometimes it is so thick that you can even drive cars on the lake! For my lake, $T = 0.17D^2$, where T is number of days, and D is the depth of the ice (in inches).

   (a) Make a table showing the time it takes for the ice to grow to a depth 5, 10, 15, and 20 inches. Please report your answer to the first decimal place.

   (b) Approximately how deep will the ice (in inches) be after 30 days? Please report your answer to the first decimal place.

   You may use whatever method you prefer to answer the question, but please give an answer accurate to one decimal place.

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5. In Saudi Arabia, gasoline prices are recorded in riyals/liter. (The riyal is the currency of Saudi Arabia). The average price of gasoline in Saudi Arabia is 0.45 riyals/liter. What would that price be in terms of US dollars per gallon?

   Useful facts: $1.00 ≈ 3.70 riyals and 1 gallon ≈ 3.8 liters