

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:

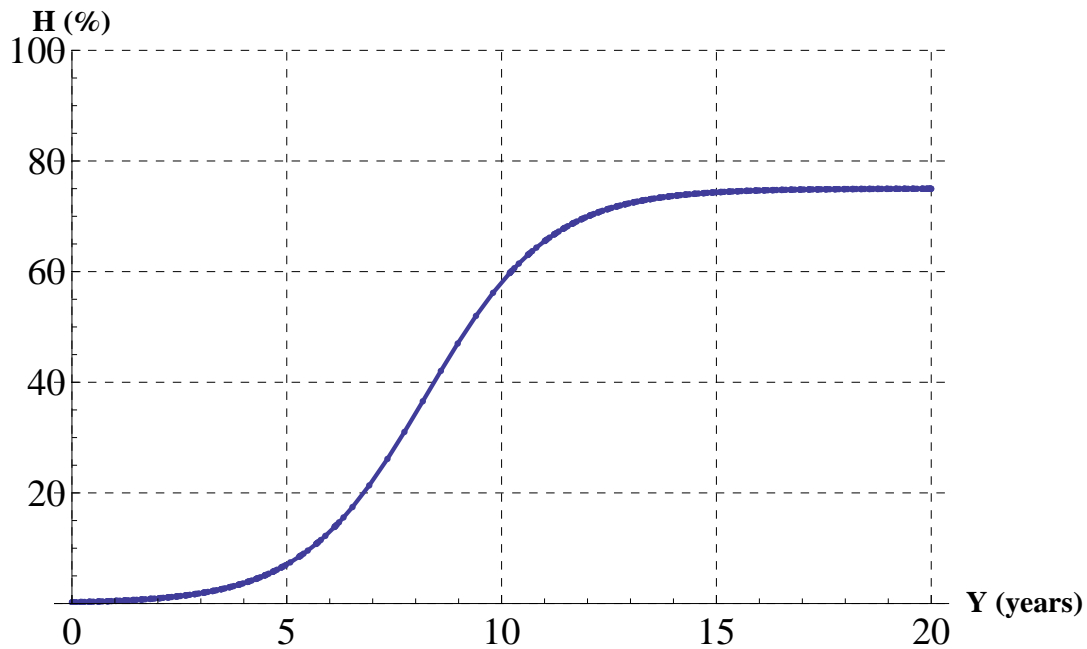
Root Formula:

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 Cassette 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 2011, what do you think it would look like? Describe your reasoning with a sentence or two.

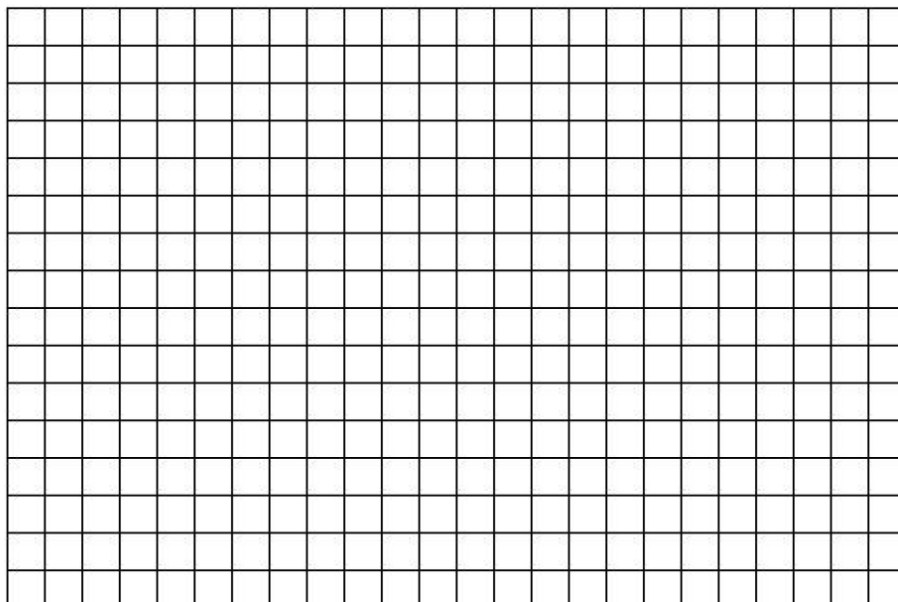
2. To hire an handyman to fix my broken garage door it costs \$95 for the service call plus a \$45 hourly rate.

(a) Make a table showing the cost of the handyman's visit if he works for 1 hour, 2 hours, and 4 hours.

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

(c) The bill for the handyman's work was \$252.50. Solve your equation to determine how long he worked. *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 handyman's bill changes with his hours worked. Be sure to (a) label your axes, (b) scale your axes appropriately to fill the entire graph paper, and (c) include all of the data in your table.



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 when $Y = 0$ (the year 2005), $Y = 5$ (the year 2010), $Y = 10$ (the year 2015), and $Y = 15$ (the year 2020). Please report your answer to the first decimal place. Please report your answer to the first decimal place.

(c) Use successive approximations to predict when the production will rise above 95 million tons. *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 the 2008 Olympics in Beijing, China, Usain Bolt from Jamaica won the gold medal in the 200 meters with a time of 19.30 seconds. His speed, therefore was $200 / 19.30 = 10.36$ meters per second. How fast would that speed be in miles per hour? (*In other words, convert 10.36 meters per second to miles per hour.*)

Useful facts: 1 hour = 3600 seconds and 1 mile = 1609 meters

$$\frac{10.36 \text{ meters}}{1 \text{ second}}$$