MA 153 Fall 2004 Homework 1 **Due Friday 8-27-04 (10 pts)** Name_____

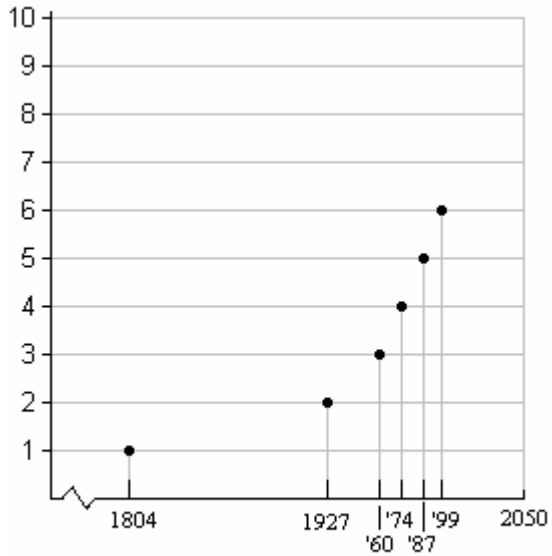
World population did not reach one billion until 1804. It took 123 years to reach 2 billion in 1927, 33 years to reach 3 billion in 1960, 14 years to reach 4 billion in 1974 and 13 years to reach 5 billion in 1987. It has taken just 12 years for the world to add this most recent billion people. This is the shortest period of time in world history for a billion people to be added.

Table 1. World population milestones

Year, t	World population P (billions)
1804	1
1927	2
1960	3
1974	4
1987	5
1999	6

Source: United Nations Population Fund

Figure 1. World population



1. Do you think the world population from 1960 to 1999 is growing at an approximately constant rate? Explain your reasoning. If it were at a constant rate, predict the population of the world in 2050.

(4) 2. Calculate the average rates of change of the world population on these intervals. Show work. Report units.

from 1804 to 1927:

from 1927 to 1960:

from 1960 to 1974:

from 1974 to 1987:

from 1987 to 1999:

(4) 3. Report each of the above rates in people per minute. Show work. Use 1 year = 365.25 days.

from 1804 to 1927: $\frac{\Delta P}{\Delta t} = \frac{10^9 \text{ people}}{123 \text{ years}} \cdot \frac{1 \text{ yr}}{365.25 \text{ days}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \approx 15 \text{ people per minute}$

from 1927 to 1960:

from 1960 to 1974:

from 1974 to 1987:

from 1987 to 1999:

(1) 4. After looking at the calculations, reflect on Question 1 again about the increasing population. Would you say the *rates* are decreasing, constant, or increasing? _____

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(1) 5. There are many world population clocks on the Internet. Some are dynamically updated at every tick of the clock. Use the Internet search engine to find one. Then report the world population, date and time you are reporting, and the Internet address of the population clock.

World population: _____

Date _____

Time (approx) _____

Internet address: _____