HONORS CHEMISTRY – Understanding a Pattern in Numbers

One of the keys to understanding chemistry is an ability to look at data - at some type of measurement – and to find a pattern or a trend among those numbers. For example, we might ask ourselves why the density values of certain kinds of materials are so high or so low? We might want to find out the rate at which our body metabolizes food and to see if it changes at certain times during the day. Scientists frequently pose questions, take measurements, and then try to detect significance in the experimental outcome.

I would like you to simply look at some numbers and try your hand at numerical analysis. Below you will find results of four different events from the Olympic Games over a forty-year period of time. You are given the gold-medal result from each event for the Olympics of the year indicated. *Choose three of these events to study.* I would like you to graph the results. [redacted] by hand, [redacted] plot the year of the Olympics on the horizontal axis. Then plot the result of the event on the vertical. When your points are plotted, connect the points. Then simply answer the questions that are given.

YEAR/LOCATION	TRACK AND FIELD Men's Pole Vault (m)	SWIMMING Women's 400 m Free (minutes)	TRACK AND FIELD Men's 100 m (seconds)	SWIMMING Men's 4 x 100 Medley Relay (minutes)
1952 Helsinki	4.55	5:12.1	10.79	
1956 Melbourne	4.56	4:54.6	10.62	
1960 Rome	4.70	4:50.6	10.32	4:05.4
1964 Tokyo	5.10	4:43.3	10.06	3:58.4
1968 Mexico City	5.40	4:31.8	9.95	3:54.9
1972 Munich	5.50	4:19.0	10.14	3:48.2
1976 Montreal	5.50	4:09.9	10.06	3:42.2
1980 Moscow	5.78	4:08.8	10.25	3:45.7
1984 Los Angeles	5.75	4:07.1	9.99	3:39.3
1988 Seoul	5.90	4:03.9	9.92	3:36.9
1992 Barcelona	5.80	4:07.2	9.96	3:36.9
1996 Atlanta	5.92	4:07.3	9.84	3:34.8
2000 Sydney	5.90	4:05.8	9.87	3:33.7
2004 Athens	5.95	4:05.3	9.85	3:30.7
2008 Beijing	5.96	4:03.2	9.69	3:29.3

For ***each*** result, answer briefly:

(1) What is the general trend that you notice?
(2) Find a discrepancy in the trend. How do you explain it?
(3) What do you expect the result in your events to be in 2020? (Make this very approximate!)