Warming up!!!

1. [20 pts] In a magnetic disk, the platters containing the data are constantly rotating. On average, it should take half a revolution for the desired data on the disk to spin under the read/write head. Assuming that the disk is rotating at 5400 revolutions per minute, what is the average time for data to rotate under the disk head? Let us also assume that the disk can transmit 10MB of data to CPU per second. If we have data lined up in consecutive bytes (as a sector) in terms of 512 byte chunks, how long will it take to transmit 10 such chunks/sectors to memory (each chunk is in its own location and randomly distributed). How long will it take if the disk rotates at 7200 revolutions per minute?

2. [10 pt] Assume that wafer A has 1.5 times as many dies on it as wafer B and that the same fabrication process is used for both wafers (thus defects per unit area is a constant). What is the relationship between the cost of two dies?

3. [20 pt] We wish to compare the performance of two different machines M_1 and M_2. The following measurements have been made on these machines:

Program	Time on M_1	Time on M_2
1	50 sec	82 sec
2	89 sec	87 sec
3	50 sec	48 sec

Which machine is faster for each program and by how much? For program 1, M_1 executed 46 million instructions while M_2 executed 18 million instructions. What is the instruction execution rate for each machine while executing program 1? Can we say something about the instruction execution rate of the other two programs as well? Explain your answer.