Calculating Average IO Time

In order to calculate the average IO time for a block of data, it is important to understand a few things:

average IO time =
average access time + (amount to transfer/transfer rate) + controller overhead

controller overhead = determined from the disk specification (given in the problem)
average access time = average seek time + average latency
average seek time = determined from the disk specification (given in the problem)
average latency = determined from the disk specification (given in the problem)

Spindle (rpm)	**Average Latency**
4,200	7.14
5,400	5.56
7,200	4.17
10,000	3
15,000	2

In order to demonstrate understanding of the above concepts, work through the following examples:

Calculate the time it takes (on average) to transfer a 4KB block on a 7200 RPM disk with a 5ms average seek time, 1Gb/sec transfer rate with a .1ms controller overhead (same example as in the book, please show your work):

Calculate the time it takes (on average) to transfer a 8KB block on a 10,000 RPM disk with a 3ms average seek time, 1Gb/sec transfer rate with a .1ms controller overhead (please show your work):

Calculate the time it takes (on average) to transfer a 64KB block on a 10,000 RPM disk with a 3ms average seek time, 1Gb/sec transfer rate with a .1ms controller overhead (please show your work):