Cache Problem

1. Consider a direct-mapped cache with 64 blocks and a block size of 16 bytes. To what block number does byte address 1200 map?

(Solution) As I mentioned in the class, you have to find the block size first. 1 block = 16 bytes
Then find the memory block number that byte address 1200 belongs to. Since 1 block is 16 bytes,

byte address  
0 ~ 15 : block 0
16 ~ 31: block 1  
Therefore, floor (byte address / block size) = memory block #
32~ 47: block 2
....

So floor(1200/16) = 75. Then you need to find which cache block memory block 75 maps to.
In a direct-mapped cache, cache block # = memory block # mod (total block number of cache)
Therefore, 75 mod 64 = 11.

2. Consider a 2-way set associative cache with 64 blocks and a block size of 16 bytes. To which set number does byte address 1200 map?

Since the cache is 2-way set associative, a set has 2 cache blocks. Because there are 64 cache blocks, there are 32 sets in the cache (set 0 ~ set 31).
Again, byte address 1200 belongs to memory block 75. Then set # = memory block # mod (total sets in the cache). Therefore, 75 mod 32 = 11. So memory block 75 maps to set 11 in the cache (cache block 22 and 23) and chooses one of them. How to choose one of them is a very long story.