Math 105, Fall 2016
HW #7 Answers

1.
12345
21435
24153
42513
45231
54321
53412
35142
31524
13254
12345

You should have a total of ten different rearrangements (only count "12345" once)

2. In order, the permutations taking us from 12345 to each of the above rearrangements are:

(AB)(CD)
(ACEDB)
(AD)(CE)
(AEBCD)
(AE)(BD)
(ADCBE)
(AC)(BE)
(ABDEC)
(BC)(DE)
( ) – identity (last line)

3. a) Same as #1, except in each line switch the numbers 1 and 2.
For example, the first few lines would be:
21345 (rather than 12345)
12435 (rather than 21435)
14253 (rather than 24153)
41523
45132
54312
53421
35241
32514
23154
21345

b) In order, the permutations taking us from 12345 to each of the above rearrangements are:

(CD) - this is the permutation that changes 12345 to 12435
(BCED) - the permutation that changes 12345 to 14253
(ABD)(CE) – changes 12345 to 41523
(ACD)(BE) – changes 12345 to 45132
(ADBE)   – changes 12345 to 54312
(AE)(BDC) – changes 12345 to 53421
(AEBC)   – changes 12345 to 35241
(ADEC)   – changes 12345 to 32514
(ACB)(DE) – changes 12345 to 23154
(AB)   – changes 12345 to 21345

4. Since the subgroup (as well as each of its cosets) contains 10 permutations, and there are 120 permutations of five bells overall, this subgroup would have 120/10 = 12 different cosets.