1)
3, 17, -5, 4, 13, 8, 7, 6, 9
3, 17, -5, 4, 13, 8, 7, 6, 9 (17 <==>-5)
3, -5, 17, 4, 13, 8, 7, 6, 9 (3 <==>-5)
-5, 3, 17, 4, 13, 8, 7, 6, 9 (17 <==>9)
-5, 3, 9, 4, 13, 8, 7, 6, 17 (13 <==>6)
-5, 3, 9, 4, 6, 8, 7, 13, 17 (9 <==>7)
-5, 3, 7, 4, 6, 8, 9, 13, 17
The 7th smallest is 9.

2)
9, 8, 6, 4, -100
9, 8, 6, 4, -100 (9 <==>-100)
-100, 8, 6, 4, 9 (-100 <==>-100)
-100, 8, 6, 4, 9 (8 <==>4)
-100, 4, 6, 8, 9 (4 <==>4)
-100, 4, 6, 8, 9
The median is 6.

3)
3, 1, 2, 4, 5, 8, 7, 6, 9
3 cannot be possible pivot because 1 is not greater than 3.
1 cannot be possible pivot because 3 is not less than 1.
2 cannot be possible pivot because 3 is not less than 2.
4 CAN be a possible pivot because everything left is less and everything right is greater.
5 CAN be a possible pivot because everything left is less and everything right is greater.
8 cannot be possible pivot because 6 is not greater than 8.
7 cannot be possible pivot because 6 is not greater than 7.
6 cannot be possible pivot because 7 is not less than 6.
9 CAN be possible pivot because everything left is less than 9.
The possible pivots are 4, 5, 9.

4)
1, 2, 3, 4, 5 (Random num: 0, so 1 stays in place)
1, 2, 3, 4, 5 (Random num: 1, so 2 stays in place)
1, 3, 2, 4, 5 (Random num: 1, so 2 and 3 exchange)
1, 4, 2, 3, 5 (Random num: 1, so 4 and 3 exchange)
1, 4, 2, 5, 3 (Random num: 3, so 4 and 3 exchange)
So sequence of random numbers is 0,1,1,1,3. These represents the indices.

5)
a) this bad shuffles generates N^N permutations. So with $N = 3$ in this problem. Total permutations is $3^3 = 27$.

b) KFY shuffle generates $N!$ permutations. So with $N = 3$ in this problem. Total permutations is $3! = 6$.

c) This is a problem because 27 from the bad shuffle does not evenly divide 6, leading to uneven distribution of permutations. Therefore there is a bias that some permutations are overrepresented and some underrepresented.