All statement implies from formula $\det A = \sum (-1)^{[i_1,i_2,\ldots,i_n]} a_{i_1 1} a_{i_2 2} \ldots a_{i_n n}$.

1) if we substitute $a_{i_k k}$ by $t a_{i_k k}$, (row is multiplied by t) then we can bring t out of sum, and we are done.

2) as any transposition changes sign of permutation, then $[i_1,i_2,\ldots,i_n]$ will be changed from odd to even and vice versa in every summand, so sign of det A will be opposite.

3) if one of rows is equal to another one, then their permutation change sign of det A, and in general det A will be the same. It can be iff det A=0. So, if we have

$$\sum (-1)^{[i_1,i_2,\ldots,i_n]} a_{i_1 1} a_{i_2 2} \ldots \left(a_{i_k k} + t a_{i_l l}\right) \ldots a_{i_n n} = \sum (-1)^{[i_1,i_2,\ldots,i_n]} a_{i_1 1} a_{i_2 2} \ldots \left(a_{i_k k}\right) \ldots a_{i_n n} + t \sum (-1)^{[i_1,i_2,\ldots,i_n]} a_{i_1 1} a_{i_2 2} \ldots \left(a_{i_l l}\right) \ldots a_{i_n n}$$

then in first summand all i's are distinct, and in second l is being used twice, so second summand is zero.