Assignment 3

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Two dice are thrown. The events A, B and C are as follows:

- A: getting an even number on the first die.
- B: getting an odd number on the first die.
- C: getting the sum of the numbers on the dice ≤ 5.

State true or false for following: (give reason for your answer)

1) A and B are mutually exclusive
2) A and B are mutually exclusive and exhaustive
3) $A = B'$
4) A and C are mutually exclusive
5) A and B' are mutually exclusive
6) A', B', C are mutually exclusive and exhaustive

Solution:

1) **True**
   We know that any number can't be both odd and even.
   So,there won't be any common elements in A and B.
   So,A and B are mutually exclusive.
2) **True**
   Any number on dice either be odd or even,there is not any possibility other than odd and even.
   So,A and B are mutually exhaustive and from 1^{st} part we know that A and B are mutually exclusive.
   So,A and B are mutually exclusive and exhaustive.
3) **True**
   We also know that if 2 sets are mutually exclusive and exhaustive,then the two are complimentary of each other.
   And from 2^{nd} part we know that A and B are mutually exclusive and exhaustive.
   So, A and B are compliment of each other i.e. A=B'
4) **False**
   In C the condition is sum of both dice to be less than equal to 5.
   So, first dice can have all natural number less than 4 which means have both even and odd numbers.
   So, A and C have common even numbers.
   That's why A and C can't be mutually exclusive.
5) **False**
   from 3^{rd} part, A=B'
   So, A and B' can't be mutually exclusive because they are same
6) **False**
   from 4^{th} we know that A and C are not mutually exclusive
   and from 3^{rd} we know that A=B'
   So, B' and C are not mutually exclusive
   So,A',B',C are not mutually exclusive because B' and C are not mutually exclusive