

## Game 45 – Golfers

Six golfers—Francois, Hillary, Nalyse, Oscar, Roman and Yvonne—are each members at one or more of three local golf courses—Palisades, Sylvan and Wildwood. The membership of the golfers must meet the following requirements:

If Roman is a member, Francois is not.

If Nalyse is a member, then so is Francois.

If either Hillary or Yvonne is a member, so is Roman.

- Which one of the following could be true?
  - Yvonne is a member at all three golf courses.
  - Francois is a member at all three golf courses.
  - Roman is a member at all three golf courses.
  - Nalyse is a member at more golf courses than Yvonne.
  - Hillary is a member at more golf courses than Roman.
- If Oscar and none of the others is a member at Wildwood, which one of the following is the minimum and maximum numbers of golfers among the six who could be members at Palisades?
  - one, four
  - one, five
  - two, four
  - two, five
  - three, five
- If Hillary and Yvonne are not members at any of the same golf courses, each of the following must be true EXCEPT
  - Hillary is a member at exactly one golf course.
  - Roman is a member at exactly two golf courses.
  - Nalyse is a member at exactly one golf course.
  - All golf courses have at most three of the six golfers as members.
  - All golf courses have at least three of the six golfers as members.
- Which one of the following must be false?
  - Yvonne is a member at exactly two of the golf courses.
  - Oscar is a member at exactly two of the golf courses.
  - Nalyse is a member at every golf course Oscar is.
  - Francois is a member at more golf courses than Roman.
  - Nalyse is a member at more golf courses than Francois.
- If Roman is a member at Palisades but Yvonne is not, which one of the following is a complete and accurate list of the golfers among the six, any one of which could be members at more than one golf course?
  - Roman, Yvonne
  - Roman, Oscar
  - Roman, Yvonne, Hillary
  - Roman, Hillary, Oscar
  - Roman, Yvonne, Hillary, Oscar
- Suppose the condition that if either Yvonne or Hillary is a member, so is Roman, is suspended and replaced with the condition that if Roman is a member, Hillary must also be. If all other conditions hold, which one of the following is a complete and accurate list of the golfers, any one of which could be a member at all three golf courses?
  - Oscar
  - Oscar, Yvonne
  - Roman, Yvonne
  - Hillary, Roman, Oscar, Yvonne
  - Hillary, Oscar, Yvonne

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1. D
2. C
3. E
4. E
5. D
6. E

For Question 1, Yvonne, Francois, and Roman can't be members at all three because everyone is a member at one of the golf courses at the very least, and all of these, directly or by inference, cannot be with another golfer. For example, if Hillary is a member, Roman is a member, and since Roman can't be with Francois, Hillary cannot be. This game forms clusters—Nalyse and Francois, as well as Hillary, Yvonne and Roman. Oscar, however, can go anywhere.

On Question 2, since all golfers must be members at one course at the very least, the other two golf courses must have Francois and Nalyse and Yvonne, Hillary, and Roman, respectively, since these elements could not be placed anywhere else. The minimum number would thus be two—Hillary and Roman, while the maximum would be the other three plus Oscar. (Remember that elements can go twice)

The key deduction on Question 3 is that since both Hillary and Yvonne impel the existence of Roman, there must be two courses where Roman is a member (one with Hillary and one with Yvonne) and one where Francois and Nalyse are members. This establishes all the answers except E—one group can only have Francois and Nalyse. On Question 4, Nalyse cannot be a member at more golf courses than Francois because if Nalyse is a member, so is Francois.

On Question 5, you can deduce that there must be another golf course where Hillary and Roman are members, since Hillary must be a member of at least one golf course, and if Hillary is a member, Roman is a member. Thus Hillary can be a member at Palisades – where Roman is without Yvonne, and at the course at which Yvonne is a member. Oscar, subject to no rules, can also be a member at more than one course. Question 6's change of the rules might confuse you—note that though the rule for Roman is now reversed, Roman can still not be with Francois. The answer is E because while Roman now impels the existence of Hillary, Hillary can be a member without Roman, and thus with Francois.