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PT Set No 178

Directions: Study the following information carefully and answer the questions given beside.

A professor has seven students, all of different ages. He gives clues about their genders as follows:

1. My oldest two students are female.
2. My youngest two students are male.
3. If my third youngest student is female, all the rest are male.
4. If my third oldest student is male, five of the other students are female.
5. If my fourth oldest student is male, all my students are male.
6. I have exactly four male students.
7. I have exactly five female students.
8. My oldest student is male.

The professor is old, and his statements are often inconsistent. It is therefore required to choose a subset of his statements and draw inferences from them.

1. If statements 1, 2, 4 and 6 are considered, which of the sequences below correctly represents the gender of the third, fourth and fifth oldest students (in that order)?

- | | | |
|-------------------------|-----------------------|-----------------------|
| A. Female, Male, Female | B. Male, Female, Male | C. Female, Male, Male |
| D. Female, Female, Male | E. None of these | |

2. If statements 2, 4 and 5 are considered, how many students' gender do we know for sure?

- | | | | | |
|------|------|------|------|------|
| A. 3 | B. 4 | C. 5 | D. 6 | E. 7 |
|------|------|------|------|------|

3. If statements 1, 4, and 7 are considered, what is the maximum, possible number of cases such that the three youngest students are female?
- A. 0 B. 1 C. 2 D. 3 E. None of these
4. If statements 4, 5 and 6 considered, how many students' gender do we know for sure according to their positions?
- A. 0 B. 1 C. 2 D. 3 E. 4
5. Consider statements 4, 5 and 8. If the third oldest child is male, which sequence correctly represents the genders of the second, fourth and sixth oldest students (in that order)?
- A. Male, Male, Male B. Male, Male, Female C. Male, Female, Male
D. Female, Female, Male E. Female, Female, Female

Correct Answers:

1	2	3	4	5
C	B	B	C	E

Explanations :

1. Statement 1 tells us that the oldest two students are female, and that the youngest two are male,
∴ Their distribution in descending order of age can be depicted as F F --- M M.

Statement 4 tells us that, if the third oldest child is male, five of the rest are female. However, if the third oldest child is male, there will be at least three male students, making it impossible that there are five female students.

Thus, the third oldest child must be female. Our distribution now looks like this: F F F - - M M

Now, we know from statement 6 that the professor has four male students.

Thus, both remaining students must be male. The final order of students is as follows: F F F M M M M.
The third, fourth and fifth oldest students are (in order) female, male and male.

Hence, option C is correct.

2. From statement 2, we know that the youngest two students are male.

From statement 4, if the third oldest student is male, five of the rest must be female.

If the third oldest student is male, it will make three male students in all, and it will be impossible for five students to be female.

∴ The third oldest student must be female.

From statement 5, we know that all the students will be male if the fourth oldest is male.

This is not possible as we know that the third oldest student is female.

∴ We can be sure about the genders of the third oldest student, fourth oldest student and the two youngest students.

∴ We know for sure the gender of 4 students.

Hence, option B is correct.

3. Statement 1 gives us the age distribution diagram as F F -----

Statement 4 gives two possible cases: F F M ----- and f f F -----

In the first case, five of the students must be female.

Statement 7 tells us that 5 of the students must be female. Thus, the maximum possible number of the youngest three students who are female is 3, for the case F F M M F F F.

This distribution satisfies all three conditions given, and is hence valid.

Hence, option B is correct.

4. From statement 6, we know that there are 4 male and 3 female students.

Statement 4 tells us that either the third oldest student is female or that there are 5 female students. The second case is impossible. Hence, the third oldest student must be female.

Statement 5 tells us that either the fourth oldest student is female or that all the students are male. All the students cannot be male, since we are given that there are only 4 males. Hence, the fourth oldest student must be female.

We cannot infer the gender of any other student from this information.

Hence, option C is correct.

5. We are given that the oldest student is male (statement 8). We are also given that the condition in statement 4 is satisfied i.e. the third oldest child is male.

∴ There must be 5 females among the students.

∴ All the remaining students must be females.

∴ The final order of students is as follow: M F M F F F F.

The second, fourth and sixth oldest children are all female.

Hence, option E is correct.



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