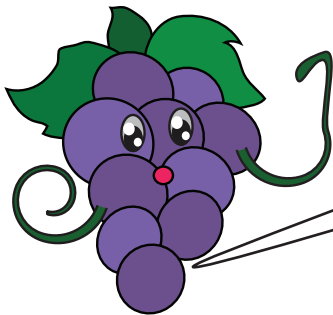


Grapes are supposed to grow on vines and not trees, however, the magic of our Maths Olympiad Tree has enabled grapes to grow on it today! **General Grapes** is good at general ability. Today, he will share with you 2 questions on general ability, particularly, logical reasoning. Try to solve the questions first, before looking at the next page for solutions.



Question 1

There are 4 students in Class 6A. Boys always tell the truth, while girls always lie. The following statements are made:

- A - There is only 1 girl in the class.
- B - Exactly 2 students are girls.
- C - Exactly 3 students are girls.
- D - Exactly 4 students are girls.

Who are the girls in the class?

Question 2

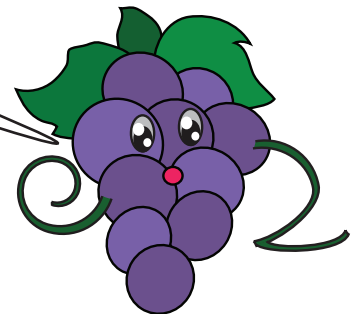
There are 4 students in Class 6B. Boys always lie and girls always tell the truth.

The following statements are made:

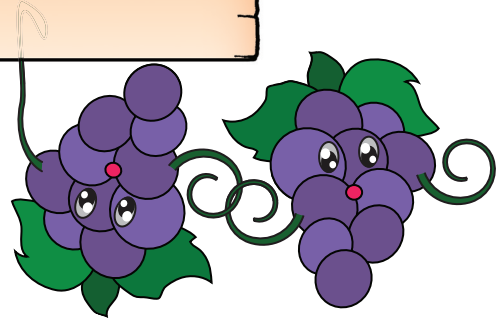
- A - B is a boy.
- B - C is a boy.
- C - D is a boy.

D - A and C have the same gender.

Who are the girls in the class?



SOLUTIONS!!!



Question 1

Solution:

First, we notice that the statements are mutually exclusive, i.e., no more than 1 of the statements can be true at the same time, as the exact number of girls can only be one of the numbers 1, 2, 3, 4 or 0. This means that there can be at most 1 boy, and at least 0 boys.

If there are 0 boys, all the students are girls and all the statements must be false. However, if all students are girls, statement D should be correct. We have a contradiction here, and there can't be 0 boys in the class.

Thus, there is exactly 1 boy in the class. This means that there are $4 - 1 = 3$ girls in the class. This makes statement C correct, and thus, the other 3 statements must be wrong. Hence, A, B and D are the girls in the class.

Question 2

Solution:

To solve this question, we start by assuming the identity of Student A first, and then proceed to deduce the rest of the students' genders.

Case 1 - A is a boy	Case 2 - A is a girl
If A is a boy, he is lying about B. Thus B is a girl.	If A is a girl, she is telling the truth about B. Thus, B is a boy.
Since B is a girl, she tells the truth. Hence C is a boy.	Since B is a boy, he lies. Hence, C is not a boy and is a girl instead.
C, being a boy, lies. This means that D is a girl and not a boy.	C is a girl and is truthful. D must thus be a boy.
D tells the truth and thus A and C must have the same gender. A and C are both boys and we have no contradiction.	D lies and A and C thus have different gender. However, A and C are both girls! We have a contradiction here!

Only Case 1 produces no contradiction and is thus correct. The girls are hence B and D.