

Game 34 – Fishing

Anglers go to a lake to see which of seven types of fish—Gar, Muskies, Northerns, Perch, Sunfish, Trout and Walleyes—it contains. The types of fish in the lake are consistent with the following conditions:

If the lake does not contain Muskies, then it does not contain Walleyes.

If the lake does not contain Northerns, then it contains Sunfish.

If the lake contains Gar, then it contains Trout.

If the lake contains Muskies, then it contains Perch.

If the lake contains Trout, then it does not contain Perch.

1. If the lake does not contain Perch, then which one of the following is the maximum number of fish among the seven types which could be in the lake?

A. 2
B. 3
C. 4
D. 5
E. 6

2. If lake contains Walleyes, which one of the following is a complete and accurate list of the types of fish among the seven which could be, but need not be, in the lake?

A. Northerns, Sunfish
B. Gar, Northerns
C. Gar, Sunfish
D. Gar, Northerns, Sunfish
E. Northerns, Sunfish, Perch

3. If there are exactly three of the seven types of fish in the lake, the lake CANNOT contain

A. Walleyes
B. Muskies
C. Gar
D. Perch
E. Northerns

4. If the lake does not contain Perch or Gar, what is the maximum number of the types of fish among the seven which can be in the lake?

A. 1
B. 2
C. 3
D. 4
E. 5

5. What is the maximum number of types of fish among the seven which can be in the lake?

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

6. If the lake contains Northerns but not Muskies, which one of the following is a complete and accurate list of the types of fish among the seven, any one of which could be in the lake?

A. Gar, Perch, Sunfish, Trout
B. Gar, Perch, Sunfish, Trout, Walleyes
C. Gar, Perch, Sunfish
D. Gar, Perch, Trout, Walleyes
E. Perch, Sunfish, Trout

7. Suppose the condition that Perch cannot be in the lake with Trout is suspended and replaced by the condition that Perch cannot be in the lake with Gar. If all other conditions remain in effect, what is the maximum number of fish among the seven types which can be in the lake?

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

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1. C
2. A
3. A
4. C
5. C
6. A
7. D

This is a sorting game loaded with “list” questions and minimum and maximum numbers. Your task is determining which elements are in the group and which are not.

On Question 1, we know that if there are no Perch, there are no Muskies, and if there are no Muskies, there are no Walleyes. This means four fish are left, and none of the remaining rules say that two fish can't be together. For Question 2, we know if there are Walleyes there are Muskies, and if there are Muskies, there are Perch, and if there are Perch, there are no Trout, and if there are no Trout, there are no Gar. This leaves only Northerns and Sunfish as elements that could go in the lake but need not. Look back at the rules and make sure you follow this lengthy chain of inferences.

Question 3 is A because if there are Walleyes there must be Muskies, which means there must be Perch, and there also must be either Northerns or Sunfish (or both) in every lake. This would mean four types of fish. The fourth question is three fish—Northerns, Sunfish, and Trout (remember there can still be Trout if there are no Gar).

Question 5 is a type you may have struggled with—the dreaded “maximum number list.” This is actually easier than you think. Notice that there is only one rule forbidding two elements to be in the group together—the rules provided that if there are Trout, there are no Perch. However, if there are Gar, there are Trout, and if there are Muskies there are Perch, and if there are Walleyes, there are Muskies. Your maximum number is the three fish—Walleyes, Muskies, and Perch, plus the other two (Northerns and Sunfish) to the exclusion of Trout and Gar. On Question 6, if there are no Muskies, there can be everything but Walleyes (since if there were Walleyes, there would be Muskies). The other four types of fish can all be in the lake.

Finally, on Question 7, the rules change, and the lake’s maximum capacity increases by one. This is because now Perch that cannot be with Gar, Trout can still be in the lake with Perch (and thus with Walleyes and Muskies) because Trout can be in the lake without Gar. Again, remember it's an “if, then” rule.