Logic Puzzles

Problem Solving Club

Birds In Trees

There are 2 trees in a garden (tree "A" and "B") and on the both trees are some birds.

The birds of tree A say to the birds of tree B that if one of you comes to our tree, then our population will be the double of yours.

Then the birds of tree B tell to the birds of tree A that if one of you comes here, then our population will be equal to that of yours.

How many birds in each tree?

Solution

```
A: 7

B: 5
```

Cheryl's Birthday

Albert and Bernard just become friends with Cheryl, and they want to know when her birthday is. Cheryl gives them a list of 10 possible dates:

May		15	16			19
June				17	18	
July	14		16			
August	14	15		17		

Cheryl then tells Albert and Bernard separately the month and the day of her birthday respectively.

Albert: I don't know when Cheryl's birthday is, but I know that Bernard doesn't know too.

Bernard: At first I don't know when Cheryl's birthday is, but I know now.

Albert: Then I also know when Cheryl's birthday is.

So when is Cheryl's birthday? And how is this possible.

Solution

Albert: I don't know when Cheryl's birthday is, but I know that Bernard doesn't know too.

All Albert knows is the month, and every month has more than one possible date, so of course he doesn't know when her birthday is. The first part of the sentence is redundant.

The only way that Bernard could know the date with a single number, however, would be if Cheryl had told him 18 or 19, since of the ten date options only these numbers appear once, as May 19 and June 18.

For Albert to know that Bernard does not know, Albert must therefore have been told July or August, since this rules out Bernard being told 18 or 19.

Line 2) Bernard: At first I don't know when Cheryl's birthday is, but now I know.

Bernard has deduced that Albert has either August or July. If he knows the full date, he must have been told 15, 16 or 17, since if he had been told 14 he would be none the wiser about whether the month was August or July. Each of 15, 16 and 17 only refers to one specific month, but 14 could be either month.

Line 3) Albert: Then I also know when Cheryl's birthday is.

Albert has therefore deduced that the possible dates are July 16, Aug 15 and Aug 17. For him to now know, he must have been told July. Since if he had been told August, he would not know which date for certain is the birthday.

The answer, therefore is July 16.

Science Fair

Isaac and Albert were excitedly describing the result of the Third Annual International Science Fair Extravaganza in Sweden. There were three contestants, Louis, Rene, and Johannes. Isaac reported that Louis won the fair, while Rene came in second. Albert, on the other hand, reported that Johannes won the fair, while Louis came in second.

In fact, neither Isaac nor Albert had given a correct report of the results of the science fair. Each of them had given one correct statement and one false statement.

What was the actual placing of the three contestants?

Solution

Johannes won; Rene came in second; Louis came in third.

Cake

You must cut a birthday cake into exactly eight pieces, but you're only allowed to make three straight cuts, and you can't move pieces of the cake as you cut. How can you do it?

Solution

Use the first two cuts to cut an 'X' in the top of the cake. Now you have four pieces. Make the third cut horizontal, which will divide the four pieces into eight. Think of a two by two by two Rubik's cube. There's four pieces on the top tier and four more just underneath it.

Party!!!!!

Of the 100 people at a recent party, 90 spoke Spanish, 80 spoke Italian, and 75 spoke Mandarin. At least how many spoke all three languages?

Solution

10 could not speak spanish 20 could not speak italian and 25 could not speak mandarin. So there could have been 10 people who spoke none of those languages.

However that would max the number of people who could speak all three. And the problem aska at least how many speak all three. Must assume 10, 20 and 25 people are distinct. Therefore we have 55 each missing one languages -> 45 people

COIIIINNNNSSSSS!!!!!

There are 10 sets of 10 coins. You know how much the coins should weigh. You know all the coins in one set of ten are exactly a hundredth of an ounce off, making the entire set of ten coins a tenth of an ounce off. You also know that all the other coins weigh the correct amount. You are allowed to use an accurate digital weighing machine once.

How do you determine which set of 10 coins is faulty