

THE PUZZLE OF ALBERT, BERNARD AND CHERYL'S BIRTHDAY

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This puzzle became viral on social media in April 2015, despite being very trivial to solve.

1. QUESTION

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

- (1) May 15
- (2) May 16
- (3) May 19
- (4) June 17
- (5) June 18
- (6) July 14
- (7) July 16
- (8) August 14
- (9) August 15
- (10) August 17

Cheryl then tells the month of her birthday to Albert and the day of her birthday to Bernard, without the other listening.

Then Albert and Bernard make the following statements.

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

Bernard: At first I didn'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?

2. SOLUTION

This can be easily solved by systematic analysis.

Let us tabulate the 10 dates given as months and days.

Date: April 15, 2015.

Day \ Month	14	15	16	17	18	19
May		05/15	05/16			05/19
June				06/17	06/18	
July	07/14		07/16			
August	08/14	08/15		08/17		

Cheryl's birthday can be any of these ten dates.

Clue 1. *Albert doesn't know Cheryl's birthday.*

Naturally. He is given one of May, June, July or August. Whatever he got, there are more than one dates in that month, so he cannot get the date.

Albert is clueless, and so are we.

Clue 2. *Albert states that he knows that Bernard does not know.*

If the date is May 19, Bernard is given the day 19, and since May 19 is the only date with the day as 19, Bernard will know the correct date.

Similarly, Bernard can deduce June 18 if he is given 18.

Since Albert knows that Bernard doesn't know, he is sure that the date is neither May 19 nor June 18. How can Albert know that given that he is given only the month?

Simple. The month given to Albert is not May or June.

So, the month is either July or August. Also, the day is 14, 15, 16 or 17.

Let us strike out all dates that are not possible.

Day \ Month	14	15	16	17	18	19
May		05/15	05/16			05/19
June				06/17	06/18	
July	07/14		07/16			
August	08/14	08/15		08/17		

Clue 3. *Before Albert said the above statement, Bernard didn't know the date.*

It only means that the day given to Bernard is not 18 or 19. We don't get any more information here.

Clue 4. *After Albert made the statement given in Clue 2, Bernard states that he knows the date.*

Clue 2 gave away the fact that the month is neither May nor June. This knowledge gave Bernard a hint with which he could deduce the date. How?

This is possible when the date given to **Bernard** occurs more than once (This we already know; that is how we eliminated 18 and 19 in Clue 2), and eliminating May and June will leave him with exactly one date for the day he is given.

In other words, among the remaining dates, the number given to **Bernard** occurs only once.

This means he was not given 14. There are two 14s (July 14 and August 14) remaining. But it can be 15 (August 15), 16 (July 16) or 17 (August 17).

Note that **Bernard** already knows the answer, because he has the day. Only we have a confusion whether it is August 15, July 16 or August 17.

Month \ Day	14	15	16	17	18	19
May		05/15	05/16			05/19
June				06/17	06/18	
July	07/14		07/16			
August	08/14	08/15		08/17		

Clue 5. *After **Bernard** made the statement mentioned in Clue 4, **Albert** declares that he knows the date.*

If the month is August, **Albert** cannot deduce the date, because there are two potential dates: August 15 and August 17. So, we can eliminate August 15 and August 17.

However, if the month is July, there is only one case: July 16.

Month \ Day	14	15	16	17	18	19
May		05/15	05/16			05/19
June				06/17	06/18	
July	07/14		07/16			
August	08/14	08/15		08/17		

We have eliminated all dates except **July 16**, which is the answer.