

## One of All Time Favourite Logic Puzzles The Three Prisoners Puzzle

I first heard this puzzle back about 1972 when the captain of my rugby team told it to me. He was a Professor of Engineering at University of British Columbia, and I had graduated in Mathematics, including honours courses, only three years earlier. So we both thought we were pretty good problem solvers. Both of us took about half-an-hour to get the puzzle and needed two hints. His wife, who was an airline stewardess, and hated Math and hadn't taken a Math course since grade 10, got the answer almost immediately, and said, "It was obvious". So here is the puzzle:

A leader of a country decides to free a political prisoner in honour of his birthday. After looking through all the prisoners, they had short-listed it to three prisoners who seemed all equal. He decided to give the prisoners a puzzle to work out, the first person to get the correct answer **AND** explain how he got it, would go free. If he incorrectly guessed at the answer, or used faulty logic to get the answer, then he got an additional **THREE** years added to his sentence. So he must be really sure of his answer and his logic to get free.

He led the prisoners down to a dark dungeon that was lighted by a single light bulb. There were no mirrors or windows in the dungeon. He showed them a bag in which he had put **3 WHITE** and **2 BLACK** disks. The prisoners saw all 5 disks. He then had them take their shirts off, and on their bare backs he secretly attached one of the disks on each of the three prisoners. The disks were put in a place where none of the prisoners could see the colour of the disk on his own back, but could see the colour of the disk on the other two prisoners' backs. The remaining two disks were kept in the bag and none of the prisoners were able to see what was left in the bag. In order to get released, they must be the first prisoner to get the correct answer **AND** explain how he got it. Remember, a false guess, or faulty logic, meant **THREE** more years of prison.

The prisoners started to move around and look at each other's backs. Remember they could not see their own backs. Nothing happened for about **30 MINUTES**, then suddenly one prisoner, let's say his name is Igor, gets an idea. He sees **TWO WHITES** on the backs of his fellow prisoners. He says, "Aha". He goes to the jail keeper, tells him his colour, and tells him the logic that led him to deduce this colour. The jail keeper says that he is correct, and he is freed.

Your mission: What colour did he have on his back, and what is the logic that led you to that decision?

Please remember, this is a logic puzzle, NOT A PROBABILITY question. You can logically get to an answer. Now, since I needed two hints to get it, I will give you the two hints as well: Pretend you are Igor, and

- (1) What do the other prisoners see? (remember, they can see your back), and
- (2) What are the other prisoners thinking. (Assume that all three prisoners are equal in intelligence).

Answer, next week.

### Answer to last week's Boolean Algebra problem

Here is the puzzle repeated from last week:

There is an island name Kalota, where the Kalotan women conform rigidly to the strange custom that a woman must never make two consecutive true or untrue statements: if one statement is true, then her next must be a lie, and vice versa.

A merchant from the island of Kalota had four attractive daughters: Kassa, Kessa, Kissa, and Kossa. There are no twins on Kalota, and the girls had this to say about their ages:

