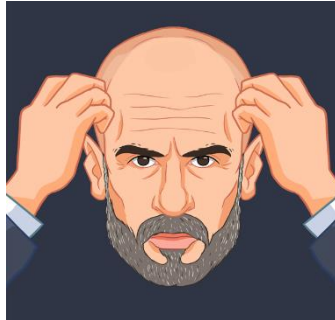# Junior Cycle

Jurgen says that Pep tells lies.
Pep says that Ole tells lies.
Ole says that both Jurgen and Pep tell lies.

Which of them is telling the truth and how do you know?

Solution

We need to examine each claim in turn and see if it makes sense.

If we assume that Jurgen is telling the truth, then Pep must be lying. Pep is therefore lying when he says that Ole tells lies, so Ole must be telling the truth. Ole is therefore telling the truth when he says that Jurgen and Pep both lie, which is a contradiction. So we can rule out Jurgen.

If we assume that Pep is telling then truth, then Ole must be lying. Ole is therefore lying when he says that **both** Jurgen and Pep tell lies, so at least one of them must be telling the truth. We are already assuming that Pep is telling the truth, so that is logically consistent. Jurgen must then be lying when he says that Pep tells lies. So Pep is telling the truth and Jurgen and Ole are lying.

Senior Cycle

You have eight boxes of identical appearance and weight and a ninth box that looks the same but is slightly lighter than the others. Using a set of balancing scales, how can you identify the lighter box in only two weighings?

1. Divide the boxes into three groups of three

2. Randomly pick two groups of three and weigh them against each other. There are now two possibilities: a) they are of equal weight or b) they are of unequal weight.

3. - If a: the lighter box must be in the third, unweighed, group of three.

   - If b: the lighter box must be in the lighter group of three.

4. Now that we have identified which group of three the lighter box is in, we can repeat the process, weighing one randomly selected box from the group against another one.

5. If the two boxes are of unequal weight, then we have now identified the lighter box. If the two boxes are of equal weight then the lighter box must be the final, unweighed, box