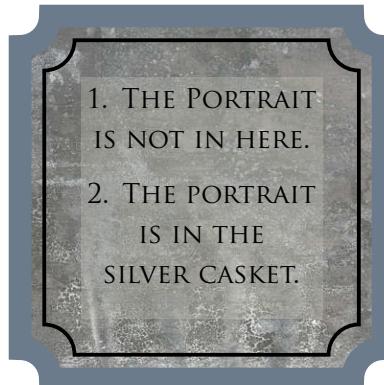
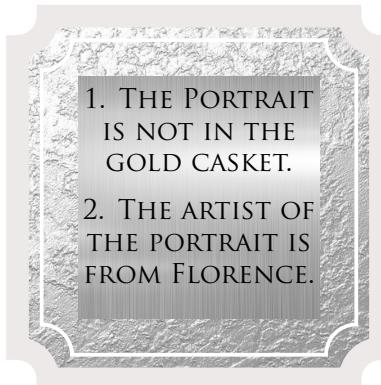
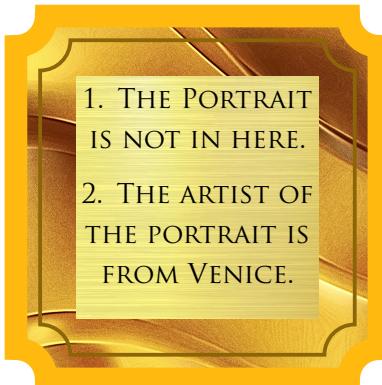




Here are the full, or partial solutions.

All years, question 1

We return to Portia's caskets! (See N° 17) As before, to win the prize (a seven kilometer gallop on a giant hedgehog) you must say which casket holds the portrait. This time each casket has two statements on its lid. Portia tells you that, no lid contains more than one false statement. Portia is truthful. Where is Portia's portrait?



Solution

Since we can trust Portia, on each lid, both statements can be true; one can be true and the other false; both statements cannot be false.

We proceed by cases: we assume the portrait is in each casket in turn. We eliminate the cases that give rise to impossible situations.

Case 1: The portrait is in the gold casket

Gold: Statement 1 is false: Statement 2 is either true or false.

Silver: Statement 1 is false: Statement 2 is either false or true.

Of the two Statement 2's on the gold and silver boxes, at least one must be false which means that on one of these boxes there are two false statements, contradicting Portia.

Case 2: The portrait is in the silver casket

Gold: Statement 1 is true: Statement 2 is either true or false.

Silver: Statement 1 is true: Statement 2 is either false or true.

Lead: Statement 1 is true: Statement 2 is true.

We have no inconsistency.

Case 3: The portrait is in the lead casket

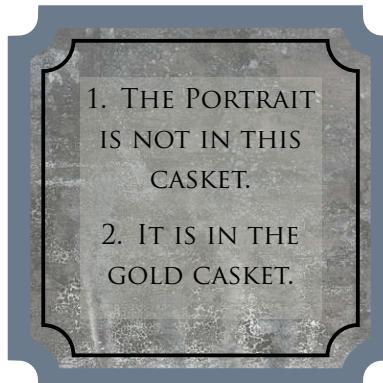
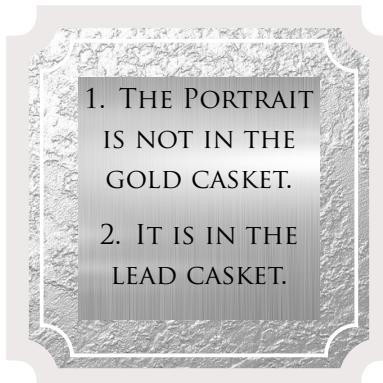
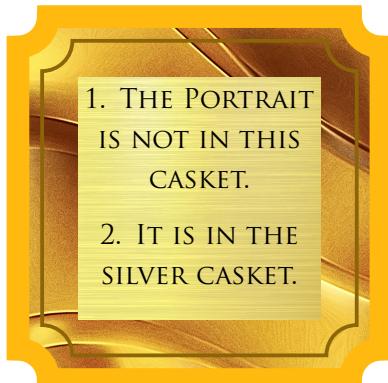
Gold: Statement 1 is false: Statement 2 is false.

Again, our assumption has led to a contradiction.

Case 2 did not arrive at a logical impossibility, so, the portrait is in the silver casket.

All years, question 2

This time, Portia tells you that on one of the lids, both statements are true; on another, both statements are false; and on the third, one statement is true and one is false. Portia is truthful. Which casket holds the portrait?



Solution

Again, we are going to proceed by cases assuming the portrait is in each casket in turn, and see what that leads to.

Case 1: The portrait is in the gold casket

Gold: Both statements are false.

Silver: Both statements are false.

Lead: Both statements are true.

This case leads to an inconsistency, the statements do not agree with Portia's conditions.

Case 2: The portrait is in the silver casket

Gold: Both statements are true.

Silver: Statement 1 is true. Statement 2 is false.

Lead: Statement 1 is true, Statement 2 is false.

This case leads to an inconsistency, the statements do not agree with Portia's conditions.

Case 3: The portrait is in the lead casket

Gold: Statement 1 is true. Statement 2 is false.

Silver: Both statements are true.

Lead: Both statements are false.

This case is consistent: the statements agree with Portia's conditions.

The portrait is in the lead casket.