

Love, luck, literature, and logic: Who will win the lady?

Which of her eager suitors will make the right guess in the gamble – and win the beautiful Portia and her fortune? Mathematician Alex Bellos gives us a new twist to a story familiar from Shakespeare's *The Merchant of Venice*: a lovely and virtuous heiress is compelled by her late father's will to marry the man who chooses, out of three caskets, the one which contains her portrait.

Portia knows which suitor she wants. They love each other! But she may not tell him which casket to choose. Still...in the version given by Alex Bellos, she can hint! So she writes the following statements on the three caskets, and tells Bassanio that of the three statements *at most* one of them is true. If you were helping the lovers, what guidance would you give him so that he chooses correctly the casket that holds the portrait?

The portrait is in this casket	The portrait is not in this casket	The portrait is not in the gold casket
GOLD	SILVER	LEAD

Now, as a student of IB Theory of Knowledge, think about the help you just gave Portia and Bassanio toward love and marriage:

How did you know which casket held the portrait?

What was the process by which you arrived at your conclusion?

What is the difference between deductive reasoning, inductive reasoning, and hypo-thetico deductive reasoning?

Which did you use for this puzzle? Which ones are used in mathematics, the natural sciences, and the human sciences?

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SOLUTION: The portrait is in the silver casket. The gold and lead caskets have statements that contradict each other so one of them must be true. And, at a maximum, only one of the three statements is true. So the statement on the silver casket must be false. So it holds the portrait.