



14 Auguste, the Christmas goose

Authors: Ariane Beier (MATH+ School Activities),
Mehran Seyed Hosseini (Universität Potsdam)

Challenge

Tuesday, December 14: a beautiful, cold winter day. Leopold returns from the farmer’s market with full shopping bags and is sure: on Christmas Eve, his family will have the most delicious holiday feast. Fragrant pastries, the finest hors d’oeuvres, and, of course, a crispy Christmas goose. Leopold’s mouth is already watering.

Attracted by the rustling and rumbling of the bags, his children, Elis, Gerda, and little Piotr, enter the kitchen with curious faces.

“Would you please get the goose from the cargo bike?!” Leopold asks his children.

“Dad! I thought we agreed on a vegetarian Christmas menu...” Gerda grumbles. But by then Elis and Piotr have already scurried downstairs. Shortly after, they come back escorted by a big chattering bird.

“Dad... it’s still alive...” Gerda remarks the obvious.

“Yes, um... it was cheaper, and besides it’s fresher then, isn’t it?” Leopold stammers and scratches his half-bald head.

“We can’t eat it!” protests Piotr.

“No way!” Elis and Gerda agree.

“But we can hardly keep it and it is already paid for...” Leopold says in desperation.

After a lengthy argument, Leopold, Elis, Gerda, and Piotr agree on the following: Leopold places five boxes side by side on an imaginary straight line and places Auguste (yes, the children have already grown fond of the animal and given it a name) in a box of his choice. Then, the children are allowed to look into exactly one box together. If Auguste is in this box, they have won: Auguste will not be eaten and is a free bird. However, if Auguste is not sitting in the chosen box, Leopold places her in an *directly adjacent* box on the following day, and the children may guess again. The “game” continues until the children have found Auguste or until 24 December, when the goose definitely goes into the oven.

In order to give Elis, Gerda, and Piotr time to think and Leopold to build appropriate boxes, the game does not begin until tomorrow—that is, 15 December. The children cannot see, hear, smell or feel from the outside which box the goose is in. And, of course, Auguste is fine in all five boxes.

Which of the ten statements is correct?



Artwork: Frauke Jansen

Possible answers:

1. There is no strategy with which the children can find Auguste.
2. Whether the children can find Auguste in time depends on which box Leopold places her in at the beginning.
3. With the best strategy, the children find Auguste in the worst case on 17 December.
4. With the best strategy, the children find Auguste in the worst case on 18 December.
5. With the best strategy, the children find Auguste in the worst case on 19 December.
6. With the best strategy, the children find Auguste in the worst case on 20 December.
7. With the best strategy, the children find Auguste in the worst case on 21 December.
8. With the best strategy, the children find Auguste in the worst case on 22 December.
9. With the best strategy, the children find Auguste in the worst case on 23 December.
10. With the best strategy, the children find Auguste in the worst case just in time on 24 December.