

Speaker:

Name: Miroslav Lovric

Institution: Department of Mathematics and Statistics, McMaster University

Email: lovric@mcmaster.ca

Position: Professor

Title: "Three or Four Eggs in a Quiche?"

Intended audience: Secondary (10-12) and post-secondary

Type of presentation preferred: Long presentation (60 minutes)

Language of Presentation: English

Description:

Introduction.

In the article "Bureaucrat's Math Makes Dizzy Dozen," written by P. Rolly and J. Jacobsen- Wells and published in The Salt Lake Tribune on 11 October 2002 (Article ID: 100DF2EEC6A2847B) we read:

The menu at the Coffee Garden at 900 East and 900 South in Salt Lake City has included a scrumptious selection of quiche for about 10 years. The recipe calls for four fresh eggs for each quiche. A Salt Lake County Health Department inspector paid a visit recently and pointed out that research by the Food and Drug Administration (FDA) indicates that one in four eggs carries salmonella bacterium, so restaurants should never use more than three eggs when preparing quiche.

Inspired by this story, the proposed activity uses probability not only to identify the fallacy in this argument, but also to create interesting mathematics problems and situations.

Whom is this activity for?

This activity is designed for students with a basic understanding of probability, and it could be used in a grade 12 course, or in an introductory probability course in university. Several extensions and directions for further investigation are given so that a teacher or a course instructor can pick those which are best suited for their students.

Start.

Students can work on suggested questions and investigations on their own, or in small groups (ideally two, maximum three students). A teacher or a course instructor must decide on the amount of scaffolding provided. Although most questions here are not open-ended (so the answer is unique), students should be made aware of the fact that there are various ways at arriving to a correct answer.

Objective.

This activity engages students in a problem-solving situation, involving probability, counting (combinatorics) and graphing function.

Outline.

Initially, this activity asks students to reason about simple events related to the story. Next, we get involved into counting arguments, generalizations of certain situations and simulations to investigate the probability of certain events occurring. Simulations could

be performed using student-made objects (manipulatives), or using simple programming (Maple, Matlab, etc.). We then return to the newspaper story. In the remaining part, we learn that the store manager asks the inspector whether throwing three randomly chosen eggs from each dozen, and then making 4-eggs quiches from the remaining eggs would work. (The inspector said that she was not sure and promised to research to find the answer.) Thinking about this part inspires numerous (and slightly more advanced) questions about probability.

One of major messages this activity carries is for a student to realize that, although initially they can argue about probabilities intuitively, in order to answer more sophisticated questions they need to learn more probability. In other words, we make transparent the need to learn more mathematics. The more mathematics we know, the more realistic applications we can discuss and understand.