

Outline

I. Introduction

- A. Interest catcher that illustrates how at the very moment everyone is thinking about probability.
- B. Thank the board for their concern about high school mathematics and granting the opportunity to respond to their question.

II. Historical Background

- A. Definition of probability.
 1. How this definition relates to mathematics.
 2. How this definition relates to real world applications.
- B. The beginning of probability.
 1. The first use of probability to solve problems relating to gambling.
 2. Gerolamo Cardano, his addiction to gambling and his definition of probability.
 3. The letters of Blaise Pascal and Pierre de Fermat discussing games of chance.
 4. The first book on probability by Christian Huygens is written in 1657 (*De Ratiociniis in Aleae Ludo*- “Calculations in Games of Chance”).
 5. Jacob Bernoulli begins significant work on the notion of probability. His thoughts form the basis of *Ars Conjectandi*.
 6. Abraham de Moivre and his numerous contributions.
 7. Pierre de Laplace introduces many new ideas that form the basis for probability in 1812 when he writes *Théorie Analytique des Probabilités*.

III. Importance to Modern Mathematics

- A. Offers a method of thought distinctive from others in mathematics.
 1. Methods of justification are different.
 2. Intuition involved is different from that in calculus, proof or other fields.
 3. Focuses on topics such as randomness, independence, expected values and combinations- topics are that are not often touched on in other areas of mathematics.
- B. Probability enables us to draw numerous conclusions about the likelihood of events.

C. Gives rise to the field of statistics, which is based off of the ideas of probability distributions and the central limit theorem, among others.

D. Other key concepts

1. Law of large numbers
2. Normal distributions
3. Inclusion and Exclusion

IV. Relevance to other fields of study

A. World of finance and business

1. Risk assessment
2. Insurance companies
3. Commodity markets
4. Gambling
5. Quality control
6. Economics

B. Science

1. Genetics
2. Evolution
3. Physics
4. Forensic science- court cases

C. Meteorology

1. People base many daily decisions off weather forecasts
2. How meteorology shapes the economy at times
 - a. Sporting events
 - b. Anticipatory actions due to weather forecasts
3. Predicting future disasters such as tornadoes, earthquakes and hurricanes

D. Computer Science

1. Algorithms
2. Search engines using Bayesian principles

E. Surveys

V. Conclusion:

Reinforcement of the importance of probability both in mathematics and other fields.