

國教署數學學科中心  
雙語教數學・系列工作坊

# 課程二大綱

單維彰

國立中央大學數學系  
師資培育中心、文學院學士班

民國111年3月17日

# 本日大綱

- ◆ 數學英文字句
  - 新增教材瀏覽解說
  - VoiceABC 意見交流
- ◆ 耿文瑤老師：
  - 英語發音基礎 (2)
- ◆ 數學英文授課投影片
  - 揣測一例
  - 兼討論 A, B, C 分級

# MathEng 新增教材

## ◆ 數學英文字句

<http://shann.idv.tw/matheng/terms.html>

- 算術
- 有理數
- 平面直角坐標系、數線
- 可能性
- 巴斯卡三角與期望值
- 機率

## ◆ 可兼為課堂或自學教材

# VoiceABC 交流

- ◆ 彭老師已分享一則
- ◆ （英語教授不建議合併課程）
- ◆ 其他 ...

# 耿文瑤老師

# 投影片揣測

# 機率

# Probability

A

# Probability

機率

B



# Probability

機率 · 概率 · 或然率

C

機率 (probability) 是  
評估某事件 (event)  $A$   
可能性程度的一個  
數  $p$ ，規定

$$0 \leq p(A) \leq 1$$

$A$

Probability 是為 event  $A$   
likely to happen 的程度  
賦予一個介於 0 與 1  
之間的數  $p$  , inclusive ,  
亦即  $0 \leq p(A) \leq 1$  。

B

Probability is a numerical measure of the *degree of likelihood* for an event  $A$ ,  
 $p(A)$ , and

$$0 \leq p(A) \leq 1$$

C

# 怎樣獲得 $p(A)$ ?

- ◆ 假設機會均等：

古典機率 (Classical Probability)

- ◆ 重複做隨機試驗 (random experiments)  
取相對次數 (relative frequency)：

實驗機率 (Experimental Probability)

- ◆ 個人信念評估：

主觀機率 (Subjective Probability)

A

# 怎樣獲得 $p(A)$ ?

- ◆ 假設 equally likely :

古典機率 (Classical Probability)

- ◆ 重複做 random experiments  
取 relative frequency :

實驗機率 (Experimental Probability)

- ◆ 個人信念評估 :

主觀機率 (Subjective Probability)

B

# How to obtain $p(A)$ ?

- ◆ Assuming equal likelihood:  
Classical Probability
- ◆ Taking relative frequency from repeated random experiments:  
Experimental Probability
- ◆ Personal degree of belief:  
Subjective Probability

C

# Classical Probability

## What does It Work?

- ◆ tossing a fair coin
- ◆ rolling a fair die
- ◆ drawing a card from a well shuffled deck
- ◆ Your turn ...

C



# Classical Probability

## What does It Not Work?

- ◆ tossing a thumbtack
- ◆ tossing a plastic bottle cap
- ◆ rolling a Lego brick
- ◆ Please ...



C

# Experimental Probability

## What does It Work?

- ◆ tossing a thumbtack
- ◆ tossing a plastic bottle cap
- ◆ rolling a Lego brick
- ◆ effects of a vaccine
- ◆ Your turn ...



C

# Experimental Probability

## What does It Not Work?

- ◆ electing a president
- ◆ receiving a nice boy/girl card
- ◆ landing on Mars before 2040
- ◆ Please ...


C

# Subjective Probability

## Subjective Probability Overview

Video Quiz Course

SUBJECTIVE PROBABILITY IN ACTION



© Study.com

Save Timeline Autoplay  off Speed Normal 13K views

C

# Subjective Probability

## What is It Good For?

- ◆ Bayesian Inference
- ◆ Work as a *prior*
- ◆ Inference from data is the revision of probability (degree of belief) in the light of relevant new information.

C

# Bayes' Theorem

- ◆ Foundation of Bayesian Inference
- ◆ Philosophically Bayesian Probability
- ◆ Technically Conditional Probability

Thomas Bayes (presented by Richard Price in 1763). *An Essay towards solving a Problem in the Doctrine of Chances*.

C

# 投影片分級芻議

- ◆ A：數學專有名詞附英文
- ◆ B：加上重要相關詞彙，  
以中英夾雜的語言解釋詞彙
- ◆ C：英文為主，中英夾雜講解，  
適度安排學生的英語活動

# The End

- ◆ 下週實體
- ◆ 請由「班長」初分組