LSU E. J. OURSO COLLEGE OF BUSINESS

Dr. Chun's Numb3rs & LØgic

Broken Stick

Young H. Chun, Ph.D.

***Professor of Decision Science* &**
Cherie H. Flores Endowed Chair in MBA Studies

Broken Stick – Part I

From *Introduction to Probability*, by Charles Grinstead and J. Laurie Snell

Take a stick of unit length and break it into two pieces, choosing the break point at random.

What is the average length of the shorter piece?

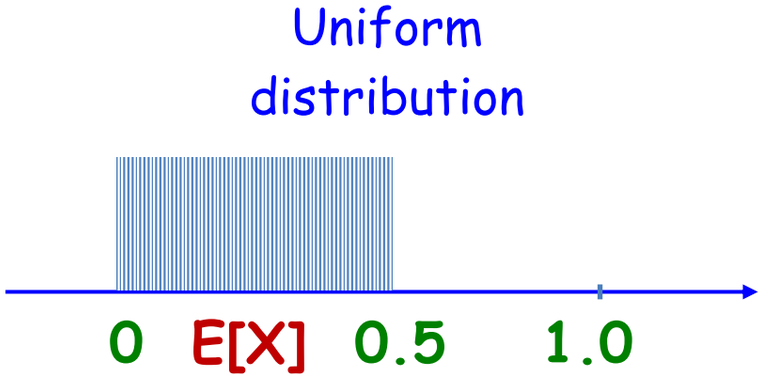
- **Variable**

  X = length of the shorter piece

  $1-X$ = length of the longer piece

- **Average length of the shorter piece**

$$E[X \mid X<1-X] = E[X \mid X<0.5] = \mathbf{0.25}$$



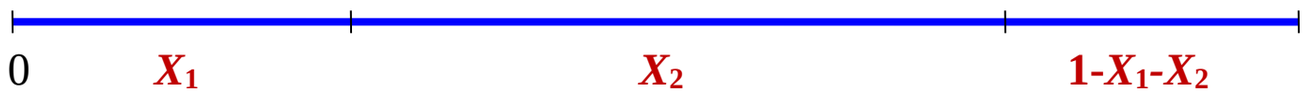
Broken Stick – Part II

From *Introduction to Probability*, by Charles Grinstead and J. Laurie Snell

Take a stick of unit length and break it into three pieces, choosing the break points at random. (The break points are assumed to be chosen simultaneously.)

What is the probability that the three pieces can be used to form a triangle?

Condition: The longest piece among the three should be less than 0.5.



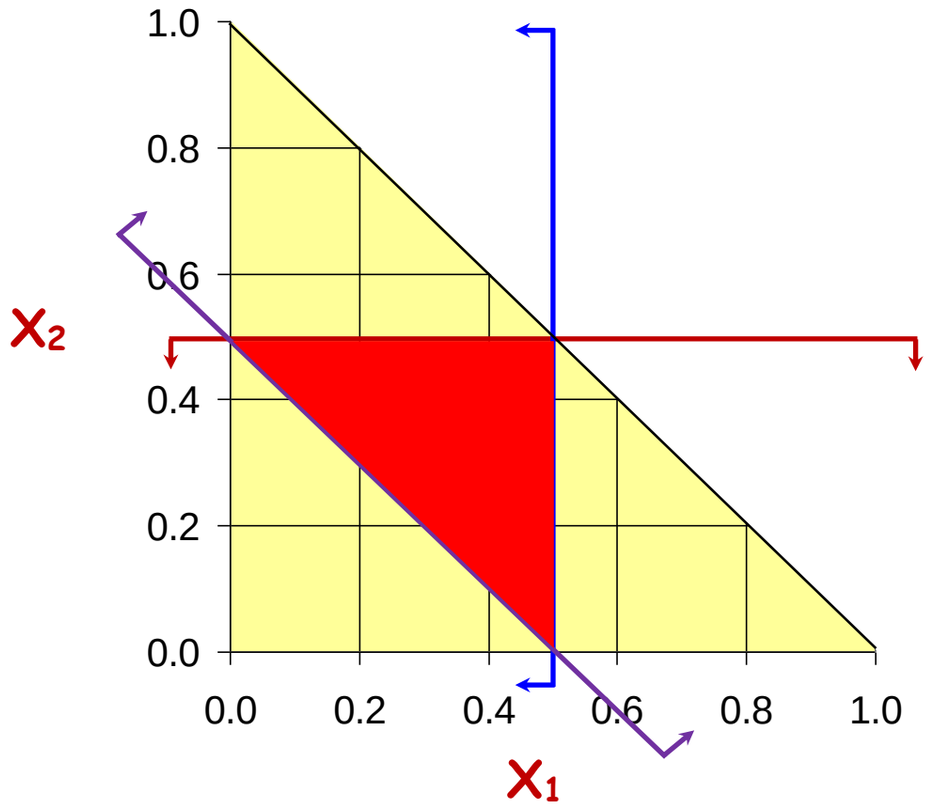
X_1 = Length of the first piece

X_2 = Length of the second piece, where $X_1+X_2 < 1$

$1-X_1-X_2$ = Length of the third piece

- **Conditions**: The longest piece should be less than 0.5

$X_1 < 0.5$, $X_2 < 0.5$, $1-X_1-X_2 < 0.5$ or $X_1+X_2 > 0.5$

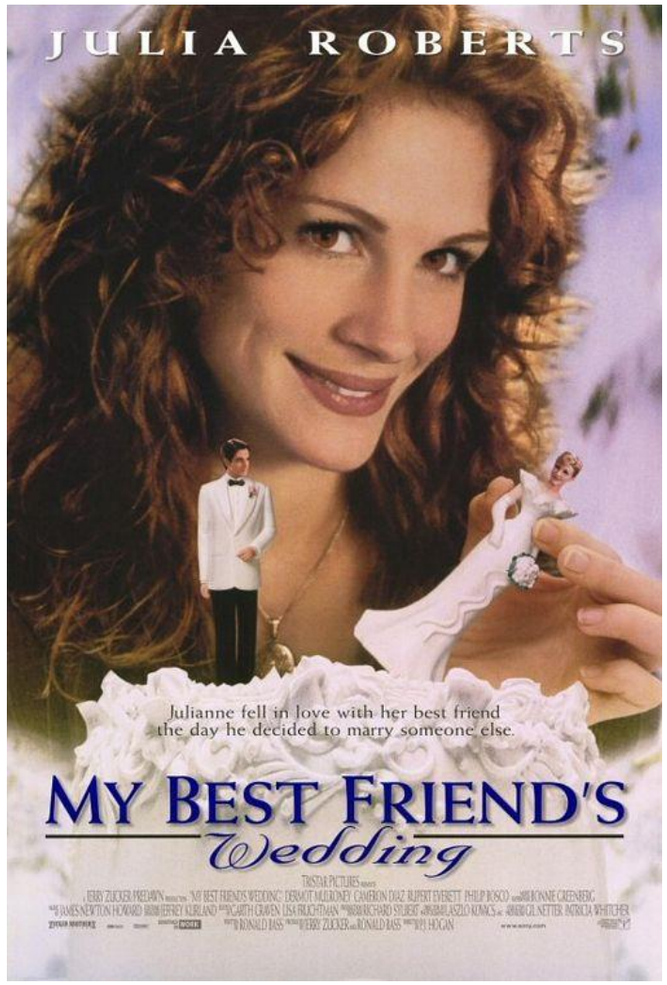


The area of the red triangle? 1/4 = **25%**

Movie Trivia

When a woman's long-time friend says he's engaged,
she realizes she loves him herself... and sets out to get him,
with only a few days before the wedding.

My Best Friend's Wedding (1997)



When a woman's long-time friend says he's engaged,
she realizes she loves him herself... and sets out to get him,
with only a few days before the wedding.