

CIT 5920 — Lecture 10: Discrete Probability Continued

08 - 08 Oct 2024

Poll results

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- What do you think the proba of E1 is?
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- What do you think the proba of E7 is?
- What is an event that has probability $\frac{5}{6}$ or $\frac{1}{6}$? FIRST MENTION WHICH YOU ARE PICKING.
- Have you:

What is an experiment in the context of probability?

A hypothesis

☐ 0 %

A procedure that results in one out of a number of possible outcomes



☐ 95 %

A theoretical calculation

☐ 0 %

A random variable

☐ 0 %

A sample space

☐ 5 %

Quiz: Probability Definitions (2/6)

0 4 2

What is the sample space of throwing a red and a blue die?

$\{1,2,3,4,5,6\}$

☐ 2 %

$\{(x,y) \mid 1 \leq x \leq 6, 1 \leq y \leq 6, x \in \mathbb{N} \text{ and } y \in \mathbb{N}\}$ ✓

☒ 64 %

$\{1,1\}, \{2,2\}, \{3,3\}, \{4,4\}, \{5,5\}, \{6,6\}$

☐ 0 %

$\{R,B\}$

☐ 2 %

$\{R1, R2, R3, R4, R5, R6, B1, B2, B3, B4, B5, B6\}$

☐ 31 %

Quiz: Probability Definitions (3/6)

040

What is the SIZE of the sample space of receiving a 5 card hand in poker represented as (from a deck of 52 cards)?

52 choose 5 ✓



52^5

5 %

5 choose 52

5 %

5^52

0 %

52

0 %

In the context of probability, what is an event?

The outcome of an experiment



32 %

The set of all possible outcomes



2 %

A subset of the sample space ✓



59 %

A probability distribution



7 %

A random variable



0 %

Quiz: Probability Definitions (5/6)

0 4 0

What is the probability of getting a royal flush in a poker game? / What are the chances of being dealt the top five consecutive cards of the same suit in a card game?

(1/2)

1/52

☐ 0 %

1/13

☐ 5 %

4/(52 choose 5) ✓

☒ 78 %

1/(52 choose 5)

☐ 18 %

Quiz: Probability Definitions (5/6)

0 4 0

What is the probability of getting a royal flush in a poker game? / What are the chances of being dealt the top five consecutive cards of the same suit in a card game?

(2/2)

1

☐ 0 %

Quiz: Probability Definitions (6/6)

0 4 1

What is the sum of the probabilities of all outcomes in a sample space?

0

☐ 0 %

1/2

☐ 0 %

1 ☒

☒ 98 %

2

☐ 0 %

It varies

☐ 2 %

What do you think the proba of E1 is?

0 2 0

- 1/2
- 0.5
- 1/2
- 0.5
- 1/2
- 1/12
- 1/2
- 1/2
- 3/6
- 1/2
- 1/2
- 0.5
- 1/3
- 1/2
- 1/2
- 1/2
- 3/6
- 1/2
- 1/2
- 1/2

What do you think the proba of E2 is?

0 2 3

- $1/2$
- $3/6$
- $3/6$
- $3/6$
- $1/2$
- $3/6$
- $1/2$
- $1/2$
- $1/2$
- $3/6$
- $1/2$
- $3/6$
- $3/6$
- $3/6$
- $3/6$
- $3/6$
- $3/6$
- $1/2$
- $3/6$
- $1/2$
- $3/6$
- $1/2$

What do you think the proba of E3 is?

024

- | | |
|-------|-------|
| ● 3/6 | ● 3/6 |
| ● 1/2 | ● 3/6 |
| ● 3/6 | ● 3/6 |
| ● 3/6 | ● 3/6 |
| ● 3/6 | ● 3/6 |
| ● 3/6 | ● 3/6 |
| ● 3/6 | ● 3/6 |
| ● 3/6 | ● 3/6 |
| ● 3/6 | ● 3/6 |
| ● 1/2 | |
| ● 3/6 | |
| ● 1/2 | |
| ● 3/6 | |
| ● 3/6 | |
| ● 3/6 | |

What do you think the proba of E4 is?

030

- $3/6$
- $3/6$
- $3/6$
- $3/6$
- $1/2$
- $3/6$
- $3/6$
- $3/6$
- $3/6$
- $1/2$
- $1/2$
- $3/6$
- $1/2$
- $3/6$
- $3/6$
- $3/6$
- $1/2$
- $3/6$
- $3/6$
- $3/6$

What do you think the proba of E5 is?

028

- [illegible]

What do you think the proba of E6 is?

030

- | | |
|--------------|-------|
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 1/3 | ● 2/6 |
| ● 1/3 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 2/6 |
| ● 2/6 | ● 1/3 |
| ● 2/6 | ● 2/6 |
| ● 2/6 OR 1/3 | ● 2/6 |
| ● 2/6 | ● 2/6 |

What do you think the proba of E7 is?

030

- [illegible]

What is an event that has probability 5/6 or 1/6? FIRST MENTION WHICH YOU ARE PICKING.

0 2 5

(1/2)

- for 5/6, "dice is greater or equal than 2". $E = \{2, 3, 4, 5, 6\}$
 - 1/6 - the probability of choosing a teamlead from a team of 6
 - 1/6: Probability that a dice rolls a 1
5/6: Probability that a dice doesn't roll a 1
 - 5/6: Probability of dice roll being greater than 1
1/6: Probability of dice roll landing on 3 (or basically any number from 1 - 6)
 - E8: event "dice is less than 6" or E9: event "dice is smaller than 2"
 - 5/6 : Prob. of not getting 1. 1/6 :
- Prob. of getting the min value of a dice
- 5/6 event "dice is not one"
 - 1/6: event dice is equal to the largest number 6
 - For 5/6: Rolling a number that is less than 6
For 1/6: Rolling a 6
 - 1/6: randomly draw a number from 1 to 6
 - 1/6 - The number is divisible by 5
 - 1/6: can be divided by 6
 - 1/6 - Event " dice is one"
 - 5/6: dice is any number except for the number 6

What is an event that has probability $5/6$ or $1/6$? FIRST MENTION WHICH YOU ARE PICKING.

0 2 5

(2/2)

- $1/6$: $E = \text{"dice can be divided by 4"}$
- $5/6$, dice is the product of 1 and another distinct integer
- $1/6$ - event "dice is 1"
- $1/6$: event: dice number is 6
- event has probability $5/6$: the dice result is not 1; event has probability $1/6$: the dice result is 1
- $5/6 = \text{event "dice is not 1"}$
- $5/6$: dice is less than 6
- $1/6$: a natural integer which is >1
 $5/6$: a natural integer which has 5 as a factor
- $1/6$: event where the dice is equal to itself squared
- $5/6$ dice is less than 6
- $5/6$: Dice roll is > 1
- $5/6$ Probability the die doesn't roll a "1".

Have you:

0 2 4

Figured it out?



Need more time?



Feel exhausted and just want solution (I feel ya!)

