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NPTEL

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Courses » An Introduction to Probability in Computing

Announcements Course Ask a Question Progress Mentor

# Unit 3 - Week 1

## Course outline

### How to access the portal

### Week 0

### Week 1

- Introduction to Probability - A box of chocolates
- Introduction to Probability - Axiomatic Approach to Probability Theory
- Introduction to Probability - Verifying Matrix Multiplication ( Statement, Algorithm & Independence )
- Introduction to Probability - Verifying Matrix Multiplication ( Correctness & Law of Total Probability )
- Introduction to Probability - How Strong is your Network?
- Introduction to Probability - How to Understand the World? Play with it!
- Tutorial 1
- Tutorial 2
- Quiz : Assignment 1

Typesetting math: 100%

## Assignment 1

The due date for submitting this assignment has passed. **Due on 2018-02-21, 23:59 IST.**

### Submitted assignment

1) We flip a fair coin five times. What is the probability of seeing at least one head and one tail? **1 point**

- 0.03125  
 0.0625  
 0.9375  
 0.96875

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

0.9375

2) Let  $A$  and  $B$  be two independent events. Let  $\bar{A}$  denote the complementary event  $\Omega - A$ . **1 point**  
Then, the events  $\bar{A}$  and  $B$  are independent.

- True  
 False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

True

3) We toss three fair coins independently. Let  $A$  be the event that the number of heads is even **1 point** and let  $B$  be the event that exactly one of the first two tosses is heads. Then,  $A$  and  $B$  are not independent events.

- True  
 False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

False

4) Two fair dice are rolled. What is the probability that their sum is 7? **1 point**

- $\frac{7}{36}$   
  $\frac{6}{36}$   
  $\frac{5}{36}$

- Week 1  
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Week 1  
assignment

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Week 2

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Week 3

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Week 4

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Session

 $\frac{5}{18}$ **No, the answer is incorrect.****Score: 0****Accepted Answers:** $\frac{6}{36}$ 

5) We toss ten fair coins independently. What is the probability that the sequence of tosses is not a palindrome? **1 point**

0.03125

.0625

0.9375

0.96875

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

0.96875

6) We toss ten fair coins independently. The probability that the sequence of tosses contains at least 4 heads is strictly greater than the probability that the sequence of tosses contains at most 6 tails. **1 point**

True

False

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

False

7) Two fair dice are rolled. What is the probability that the product of the values on the dice is divisible by 4? **1 point**

 $\frac{1}{2}$  $\frac{5}{18}$  $\frac{5}{12}$  $\frac{1}{3}$ **No, the answer is incorrect.****Score: 0****Accepted Answers:** $\frac{5}{12}$ 

8) A fair coin is flipped six times independently. Let  $A$  be the event that the odd trials are heads and  $B$  the event that the tosses form a palindrome. Then,  $\Pr(A) = \Pr(B)$ . **1 point**

True

False

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

True

9) A coin is flipped twenty two times independently. What is the probability that the number of heads is even given that the sequence of tosses forms a palindrome? **1 point**

0

- 0.25
- 0.75
- 1

No, the answer is incorrect.

Score: 0

Accepted Answers:

1

10) A fair die is rolled and the value is recorded, call it  $N$ . Then,  $N$  fair coins are flipped. What is the probability that no heads is observed? (The answer is truncated to two decimal places.) **1 point**

- 1
- 0.16
- 0.32
- 0.67

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.16

11) Two fair dice are rolled. What is the probability that the product of the values is not a prime? **1 point**

- 0
- $\frac{1}{36}$
- $\frac{30}{36}$
- 1

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{30}{36}$

12) Two fair dice are rolled. What is the probability that the product of the values is a square? **1 point**

- $\frac{6}{36}$
- $\frac{8}{36}$
- $\frac{10}{36}$
- $\frac{12}{36}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{8}{36}$

13) Two fair dice are rolled. We take the sum of the values, add this to the product of the values and finally add one to this. What is the probability that this value is divisible by 7? **1 point**

- $\frac{1}{36}$
- $\frac{1}{18}$
- $\frac{11}{36}$

$\frac{1}{3}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{11}{36}$

14) A fair die is rolled. If the value on it is odd, a second fair die is rolled as well; otherwise, the second die is not rolled. What is the probability that the sum of the values on both dice is odd given that both dice were rolled? **1 point**

$\frac{1}{6}$

$\frac{1}{3}$

$\frac{1}{2}$

1

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{1}{2}$

15) Two fair dice are rolled. Given that the sum of the values is even, what is the probability that the product of the values is odd? **1 point**

0

0.5

0.75

1

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.5

16) arrange a chessboard with pieces in starting position, however I feel funny, and decide to randomly swap the position of a pair of pieces on the whiteside. What is the probability that the pieces are still in the right starting position? **1 point**

0

$\frac{25}{120}$

$\frac{28}{120}$

$\frac{31}{120}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{31}{120}$

17) Two fair dice are rolled. What is the probability that the product is a perfect square given that the sum is even? **1 point**

0

$\frac{1}{3}$

$\frac{1}{2}$   
  
 $\frac{2}{3}$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$\frac{1}{3}$

18) By repeating Karger's Min Cut Algorithm  $n(n - 1)$  In  $n$ , we reduce the error probability to  $\frac{1}{n^2}$ . **1 point**  
 Suppose we double the number of repetitions, then the error probability reduces by at most a factor of half.

- True  
 False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

False

19) Given a tree on  $n$  vertices, how many unique min cut-sets does it have? **1 point**

- 1  
  
 $n - 2$   
  
 $n - 1$   
  
 $n$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$n - 1$

20) If a graph  $G$  has min cut of size  $k$ , then, the minimum degree over all vertices in the graph is **1 point**  
 at most  $k - 1$ .

- True  
 False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

False

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