

Unit 9 - Week 8: Combinatorics

Course outline

How to access the portal

Week 1: Mathematical Logic

Week 2: Mathematical Logic

Week 3: Mathematical Logic And Set Theory

Week 4: Graph Theory

Week 5: Graph Theory-II

Week 6: Set Theory & Number Theory

Week 7: Set Theory & Number Theory

Week 8: Combinatorics

 Pigeon Hole Principle

 Stirling Numbers, Bell Numbers

 Generating Functions

 Product of Generating Functions

 Quiz : Assignment 8

 New Lesson

 Feedback form

Week 9: Combinatorics

Live Session-1

Week 10: Number Theory

Live Session-2

Week 11: Algebra

Week 12: Algebra-II

Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-25, 23:59 IST.

1) Let $A(x)$ be the generating function of a sequence $\{a_n\}_{n \geq 0}$.
Let $\{b_n\}_{n \geq 0}$ be the sequence given by $b_n = a_{n+1}$. The generating function of $\{b_n\}_{n \geq 0}$ is **4 points**

$\frac{A(x)-(a_0)}{x}$

$\frac{A(x)+(a_1)}{x}$

$\frac{A(x)}{a_1 x}$

$x A(x)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{A(x)-(a_0)}{x}$

2) Let $A(x)$ be the generating function of a sequence $\{a_n\}_{n \geq 0}$. Let $B(x) = \frac{d}{dx}(A(x))$.
Let $\{b_n\}_{n \geq 0}$ be sequence whose generating function is $B(x)$. The $b(n)$ is equal to **4 points**

$(n+1)a_{n+1}$

na_{n+1}

$(n-1)a_{n+1}$

$(n+1)a_n$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $(n+1)a_{n+1}$

3) The number of positive integral solutions to $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$
where $a < b < c$ is **4 points**

1

2

3

4

No, the answer is incorrect.
Score: 0

Accepted Answers:
1

4) Let $S(n, k)$ denote the Stirling numbers of the second kind. The value of $S(5, 3)$ is **4 points**

25

18

23

19

No, the answer is incorrect.
Score: 0

Accepted Answers:
25

5) Let $B(n)$ denote the Bell numbers. The value of $B(4)$ is **4 points**

15

30

10

25

No, the answer is incorrect.
Score: 0

Accepted Answers:
15

6) The number of ways of forming balanced parenthesis with five pairs of parenthesis is **4 points**

42

252

6

120

No, the answer is incorrect.
Score: 0

Accepted Answers:
42

7) Let C_n denote the n^{th} Catalan number. Which of the following numbers are divisible by 10? **4 points**

C_8

C_9

C_{10}

C_7

No, the answer is incorrect.
Score: 0

Accepted Answers:
 C_8

8) Let $A(x)$ and $B(x)$ be the generating function of a sequence $\{a_n\}_{n \geq 0}$ and $\{b_n\}_{n \geq 0}$ respectively.
Let $\{c_n\}_{n \geq 0}$ be a sequence given by $c_n = \sum_{i=0}^n (a_{n+1-i} b_i)$.
Let $\{b_n\}_{n \geq 0}$ be the sequence given by $b_n = a_{n+1}$. The generating function of $\{b_n\}_{n \geq 0}$ is **4 points**

$\frac{A(x)B(x)-a_1 b_0}{x}$

$\frac{A(x)B(x)+a_1 b_0}{x}$

$\frac{A(x)B(x)}{x}$

$A(x)B(x)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{A(x)B(x)-a_1 b_0}{x}$

9) The number of ways of splitting a set of n elements into two parts is **4 points**

$2^{n-1} - 1$

2^{n-1}

2^n

n^2

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $2^{n-1} - 1$

10) The number of ways of splitting a set of 100 elements into 99 parts is **4 points**

4950

100

2^{99}

9900

No, the answer is incorrect.
Score: 0

Accepted Answers:
4950