

CSPB 2824 - Stade - Discrete Structures

[Dashboard](#) / [My courses](#) / [2237:CSPB 2824](#) / [6 November - 12 November](#) / [Counting/Binomial Quiz as MW Score](#)

Started on Friday, 10 November 2023, 4:41 PM

State Finished

Completed on Friday, 10 November 2023, 4:42 PM

Time taken 50 secs

Grade 100.00 out of 100.00

Question **1**

Correct

Mark 10.00 out of 10.00

The $n = 6$ row of Pascal's triangle reads

1, 6, 15, 20, 15, 6, 1

What is the next row of the triangle?

Select one:

- ☒ a. 1, 7, 21, 35, 35, 21, 7, 1
- ☐ b. 1, 7, 21, 35, 54, 88, 1
- ☐ c. 1, 8, 21, 35, 70, 35, 21, 8, 1
- ☐ d. 1, 2, 3, 4, 5, 6, 7
- ☐ e. 1, 7, 21, 35, 70, 28, 8, 1



Your answer is correct.

Correct

Marks for this submission: 10.00/10.00.

Question **2**

Correct

Mark 10.00 out of 10.00

Try the Pascal's triangle activities in the Pascal's Triangle supplement.

Which of the following are patterns found in Pascal's Triangle?

Select one or more:

- ☒ a. The sequence of squares. ✓
- ☐ b. The Sequence of Derivatives
- ☒ c. The sequence of integers (1,2,3,4...) ✓
- ☒ d. The Fibonacci Sequence ✓
- ☒ e. The coefficients of the binomial expansion. ✓

Your answer is correct.

Correct

Marks for this submission: 10.00/10.00.

Question **3**

Correct

Mark 10.00 out of 10.00

Read thru the example in Combinatorics supplement.

What is the probability of having 8 children, exactly 5 girls and 3 boys?

(Answer in percent, as a decimal - so 65.7% would be written as 65.7)

Answer: ✓

Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 10.00 out of 10.00

Calculate the value of the following summation involving binomial coefficients:

$$\binom{6}{0} \frac{1}{8}^6 + \binom{6}{1} \frac{1}{8}^5 \frac{7}{8} + \binom{6}{2} \frac{1}{8}^4 \frac{7}{8}^2 + \binom{6}{3} \frac{1}{8}^3 \frac{7}{8}^3 + \binom{6}{4} \frac{1}{8}^2 \frac{7}{8}^4 + \binom{6}{5} \frac{1}{8} \frac{7}{8}^5 + \binom{6}{6} \frac{7}{8}^6$$

(hint:there is a tedious way and a no- so-tedious-way to solve)

(hint:hint: See Binomial Theorem p. 416 Rosen)

Answer:

1



Correct

Marks for this submission: 10.00/10.00.

Question 5

Correct

Mark 5.00 out of 5.00

The coefficients of $(x+y)^6$ expand in expanded form are:

1, 6, 15, 20, 15, 6, 1

$$(x^6 + 6x^5y + 15x^4y^2 + 20x^3y^3 + 15x^2y^4 + 6xy^5 + y^6)$$

What are the coefficients of $(x+y)^7$ in expanded form?

Select one:



a. 1, 7, 21, 35, 35, 21, 7, 1



b. 0, 1, 7, 21, 35, 35, 21, 7, 1, 0



c. 1, 2, 3, 4, 5, 6, 7



d. 1, 7, 21, 35, 35, 28, 8, 1



e. 1, 7, 21, 35, 21, 7, 1

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **6**

Correct

Mark 5.00 out of 5.00

What are the coefficients (in expanded form) of $(2x + 3y)^2$? (This can be done by hand.)

What is the coefficient of x^2 ?



What is the coefficient of the xy ?



What is the coefficient of the y^2 ?



Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **7**

Correct

Mark 10.00 out of 10.00

What is the coefficient of the x^2y^3 in $(2x + 3y)^5$

Use the binomial theorem - remember you can substitution $2x$ for x .

(It may be helpful to rewrite the theorem with a,b's to make this clearer.)

Answer:



Correct

Marks for this submission: 10.00/10.00.

Question 8

Correct

Mark 10.00 out of 10.00

Write some code (on your own) to calculate all the coefficients of $(2x + 3y)^5$ using the binomial theorem.

What is the coefficient of x^5 ?



What is the coefficient of x^4y ?



What is the coefficient of x^3y^2 ?



What is the coefficient of x^2y^3 ?



What is the coefficient of xy^4 ?



What is the coefficient of y^5 ?



Your answer is correct.

Correct

Marks for this submission: 10.00/10.00.

Question 9

Correct

Mark 5.00 out of 5.00

Calculate the product of the coefficients in the binomial expansion of $(2x + 3y)^5$

The product is 1175462461440000.

Select one:

☒ True ✓

☐ False

Correct

Marks for this submission: 5.00/5.00.

Question 10

Correct

Mark 25.00 out of 25.00

Write a Python function **binom_product(a,b,n)** that takes three integer arguments a and b and positive integer argument n and returns the product of the coefficients in the expansion of $(ax + by)^n$.

Example: Let $a = 2$, $b = -1$, and $n = 3$. Then

$$(2x - y)^3 = 8x^3 - 12x^2y + 6xy^2 - y^3$$

The product of the expansion coefficients is $8 \times -12 \times 6 \times -1 = 576$

Notes: There are two visible test cases and three hidden test cases. Integers a and b will satisfy $-10 \leq a, b \leq 10$ and integer n will satisfy $1 \leq n \leq 10$.

For example:

Test	Result
<code>print(round(binom_product(2,-1,3)))</code>	576

Answer: (penalty regime: 0 %)

Reset answer

```

1 from math import pow, factorial
2 def binom_product(a,b,n):
3     coefficients = []
4     for j in range(n + 1):
5         result = (factorial(n) / (factorial(j) * factorial(n - j))) * (pow(a,(n - j))) * (pow(b,j))
6         coefficients.append(result)
7     result = 1
8     for i in range(len(coefficients)):
9         result *= coefficients[i]
10    return result

```

	Test	Expected	Got	
✓	<code>print(round(binom_product(2,-1,3)))</code>	576	576	✓
✓	<code>print(round(binom_product(1,3,4)))</code>	5668704	5668704	✓

Passed all tests! ✓

Correct

Marks for this submission: 25.00/25.00.

