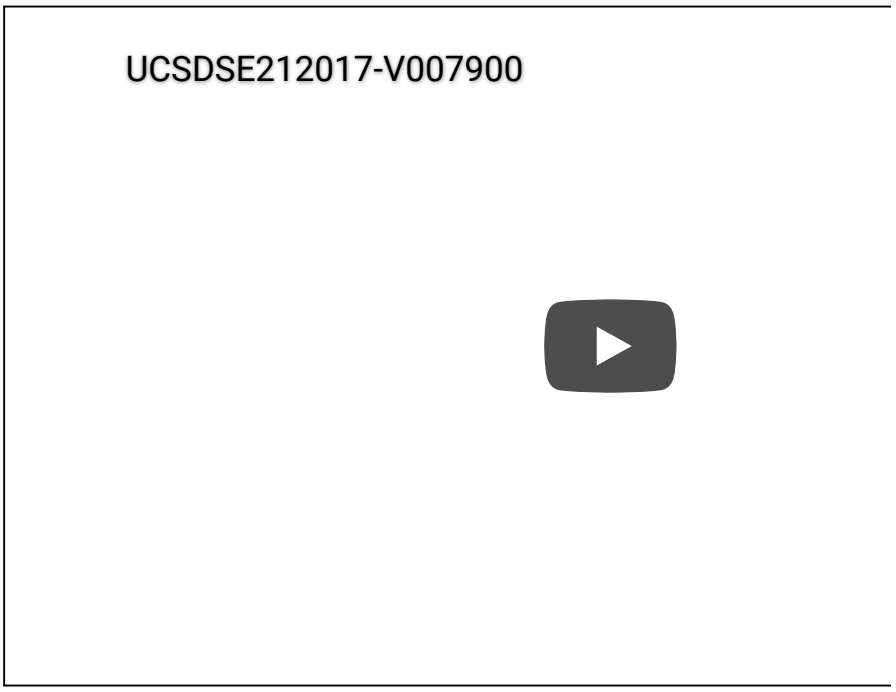
Problem Sets due May 28, 2022 08:13 +03

Video



a simple extension of the binomial coefficients

to multinomial coefficients and the binomial theorem

to the multinomial theorem and what we're going to do next

is look at another application

of binomial and related coefficients.

End of transcript. Skip to the start.

4.7_Multinomials

POLL

What is the coefficient of xy in the expansion of (x+y+2)^4?

RESULTS

12	**8%**
24	**21%**
48	**67%**

None of the above 4%

Submit

Results gathered from 24 respondents.

FEEDBACK
The answer is 48. The number of ways to have 2"2"s, 1 "x", 1 "y" is 12 (using multinomial coefficient). Then we multiply it with 2^2 = 4 and get the answer.

1 (Graded)

3/3 points (graded)
In how many ways can you give three baseball tickets, three soccer tickets, and three opera tickets, all general admission, to nine friend so each gets one ticket?

1680 ✔ **Answer:** 1680

1680

Explanation
Using the multinomial coefficient, we get the answer $\binom{9}{3,3,3} = 1680$.

Submit You have used 1 of 4 attempts

Answers are displayed within the problem

2

0 points possible (ungraded)
How many ways can we divide 12 people into:

- three labeled groups evenly

- three unlabeled groups evenly

- three labeled groups with 3, 4 and 5 people

- three unlabeled groups with 3, 4 and 5 people

- three unlabeled groups with 3, 3 and 6 people

Submit You have used 0 of 4 attempts

3 (Graded)

4/4 points (graded)

- What is the coefficient of x^3y^2 in expansion of $(x+2y+1)^{10}$?

10080 ✔ **Answer:** 10080

10080

Explanation

$(x+2y+1)^{10} = \underbrace{(x+2y+1)\cdots(x+2y+1)}_{10\ (x+2y+1)s}.$

To form x^3y^2, we need to pick three x's, two $2y$'s, and five 1's. The number of ways is $\binom{10}{3,2,5}$.

The resulting term of x^3y^2 is $\binom{10}{3,2,5}\left(x^3(2y)^2 1^5\right)$. Hence the coefficient is $\binom{10}{3,2,5}2^2 = 10080$.

- What is the coefficient of x^3 in expansion of $(x^2-x+2)^{10}$

-38400

✔ **Answer:** -38400

-38400

Explanation

$(x^2-x+2)^{10} = \underbrace{(x^2-x+2)\cdots(x^2-x+2)}_{10\ (x^2-x+2)s}.$

To form x^3, we can pick one x^2's, one $-x$'s, and eight 2's. The number of ways is $\binom{10}{1,1,8}$.

Or we can pick zero x^2's, three $-x$'s, and seven 2's. The number of ways is $\binom{10}{0,3,7}$.

The resulting term of x^3 is $\binom{10}{1,1,8}\left(x^2\,(-x)\,2^8\right) + \binom{10}{0,3,7}\left((x^2)^0(-x)^3 2^7\right)$. Hence the coefficient is $\binom{10}{1,1,8}(-1)\,2^8 + \binom{10}{0,3,7}(-1)^3 2^7 = -38400$.

Submit

You have used 2 of 4 attempts

Answers are displayed within the problem

4

0 points possible (ungraded)

How many terms are there in the expansion of $(x+y+z)^{10} + (x-y+z)^{10}$?

Submit You have used 0 of 4 attempts

5

0 points possible (ungraded)

How many anagrams, with or without meaning, does "REFEREE" have such that:

- there is no constraint

- two "R"'s are separated

- it contains subword “EE”

- it begins with letter “R”

Submit You have used 0 of 4 attempts

6

0 points possible (ungraded)

How many anagrams, with or without meaning, do the following words have?

- CHAIR

- INDIA

- SWIMMING

Submit You have used 0 of 4 attempts

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Topic: Topic 4 / Multinomial

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