edX

The binomial Theorem
Video

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UCSDSE212017-V011900

▶

- Hi again.

So, so far we've talked about binomial coefficients,

we gave some examples how to calculate them,

and we also talked about a couple of the properties,

now we want to continue with some more properties,

and talk about the Pascal Triangle and the Binomial Theorem.

▶ 0:00 / 0:00   ▸ 1.0x   🔊   ✕   CC   ❝

4.6_Binomial_Theorem

POLL
What is the coefficient of x^2 in the expansion of $(x+2)^4$?

○ **12**

○ **24**

○ **48**

○ **None of the above**

Submit

1

1/2 points (graded)

- What is the coefficient of x^4 in the expansion of $(2x - 1)^7$?

280   ✖ **Answer:** -560

280

Explanation
By binomial theorem, the number of terms that contain $(2x)^4$ is $\binom{7}{4}$. Hence, the coefficient of x^4 is $2^4 \times (-1)^3 \times \binom{7}{4} = -560$

- What is the constant term in the expansion of $\left(x - \frac{2}{x}\right)^6$?

-160   ✔ **Answer:** -160

-160

Explanation
$\left(x - \frac{2}{x}\right)^6 = (x^2 - 2)^6 \left(\frac{1}{x}\right)^6$. To find the constant term, we just need to find the coefficient of x^6 in $(x^2 - 2)^6$. The number of terms that contain x^6 is $\binom{6}{3}$, so the coefficient is $1^3 \times (-2)^3 \times \binom{6}{3} = -160$

Submit   You have used 4 of 4 attempts

ℹ Answers are displayed within the problem

2

0.0/2.0 points (graded)

What is the coefficient of x^2 in the expansion of $(x+2)^4(x+3)^5$?

| 2560 | | ✖ **Answer:** 23112 |

2560

Explanation

Consider $(x+2)^4(x+3)^5$ as the product of $(x+2)^4$ and $(x+3)^5$, there are 3 ways to get x^2: (1) multiply the x^2 term in $(x+2)^4$ and the constant term in $(x+3)^5$, (2) multiply the x term in $(x+2)^4$ and the x term in $(x+3)^5$, (3) multiply the constant term in $(x+2)^4$ and the x^2 term in $(x+3)^5$.

Hence the result is the sum of these 3 ways $\binom{5}{2}2^43^3 + \binom{4}{1}\binom{5}{1}2^33^4 + \binom{4}{2}3^52^2 = 23112$
.

| Submit | You have used 4 of 4 attempts |

🛈   Answers are displayed within the problem

3

0 points possible (ungraded)

In an earlier section, we solved this question by mapping the sets A and B to ternary sequences. In this section, we ask you to solve it using the binomial theorem.

How many ordered pairs (A, B), where A, B are subsets of $\{1, 2, 3, 4, 5\}$ have:

- $A \cap B = \emptyset$

| 243 | | ✔ |

243

- $A \cup B = \{1, 2, 3, 4, 5\}$

| 243 | | ✔ |

243

| Submit | You have used 3 of 4 attempts |

✔ **Correct**

4

0 points possible (ungraded)
Which of the followings are equal?

☑ $\binom{10}{4}$ ✔

☑ $\binom{10}{5}$

☑ $\binom{10}{6}$ ✔

☑ $\binom{9}{5} + \binom{9}{6}$ ✔

✖

Submit	You have used 3 of 3 attempts

ℹ Answers are displayed within the problem

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💬 **Staff**

💬 **The methods for solving problems like these seem a lot like linear algebra. Is that a useful way to think of it?**   1

My method for this and a few other problems was- (1) Break it down into different parts, which prod…

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💬 **Staff**