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The binomial Theorem Video



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

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1

1/2 points (graded)

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

280

X 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 $2^4 imes (-1)^3 imes \left(\begin{smallmatrix} 7 \\ 4 \end{smallmatrix} \right) = -560$

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

-160

✓ Answer: -160

-160

Explanation

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

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You have used 4 of 4 attempts

1 Answers are displayed within the problem

2

0.0/2.0 points (graded)

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



X 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 $\binom{5}{2}2^43^3+\binom{4}{1}\binom{5}{1}2^33^4+\binom{4}{2}3^52^2=23112$

•

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You have used 4 of 4 attempts

1 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

•
$$A \cup B = \{1, 2, 3, 4, 5\}$$



243

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You have used 3 of 4 attempts

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✓	()	\cap	rr	Δ	ct
•	_	o.		_	LL

4

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



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You have used 3 of 3 attempts

1 Answers are displayed within the problem

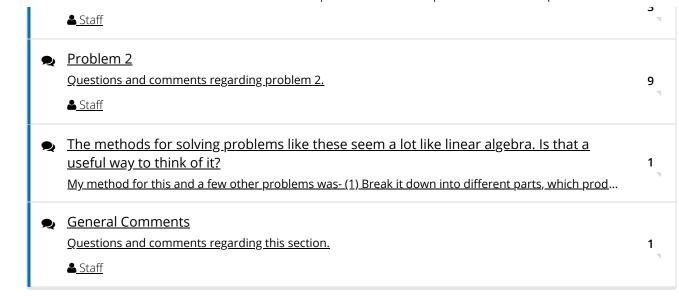
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