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MDM4U Binomial Distribution Worksheet

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- Which of the following is not a property of a binomial experiment?
 - All trials are identical.
 - Each trial has only two possible outcomes.
 - The probability of success may change from trial to trial.
 - The purpose of the experiment is to determine the number of successes that occurs during the n trials.
- In the expression of $\binom{8}{3}(0.2)^3(0.8)^5$, which value represents the number of trials?
 - 2
 - 3
 - 5
 - 8
- In the expression of $\binom{7}{2}(0.4)^2(0.6)^5$, which value represents the probability of failure?
 - 0.6
 - 0.4
 - $(0.4)^2$
 - $(0.6)^5$
- In the expression of $\binom{10}{3}(0.5)^3(0.5)^7$, which value represents the number of successes?
 - 3
 - 10
 - 5
 - 7

Binomial Expansion

Example 1

Expand $(2x-1)^4$

Answer:

$$\begin{aligned} & C_0(2x)^4(-1)^0 + C_1(2x)^3(-1)^1 + C_2(2x)^2(-1)^2 + C_3(2x)^1(-1)^3 + C_4(2x)^0(-1)^4 \\ & C_0(2x)^4(-1)^0 + C_1(2x)^3(-1)^1 + C_2(2x)^2(-1)^2 + C_3(2x)^1(-1)^3 + C_4(2x)^0(-1)^4 \end{aligned}$$

$$16x^4 - 32x^3 + 24x^2 - 8x + 1$$

Example 2

Find the 6th term of the expansion $(\frac{1}{2}x-2)^6$

Answer:

$$C_5 \binom{6}{5} \left(\frac{1}{2}x\right)^1 (-2)^5 = -96x$$

The term in x^2 is

$$\frac{8!}{2!6!} \times (4kx)^2 x^6 = \frac{8 \times 7}{2} (16k^2 x^2) = 448k^2 x^2$$

The term in x^3 is

$$\frac{8!}{3!5!} \times (4kx)^3 x^5 = \frac{8 \times 7}{2} (64k^3 x^3) = 1792k^3 x^3$$

Therefore,

$$\begin{aligned} 1792k^3 &= 16 \times 448k^2 \\ 1792k &= 7168 \\ k &= 4 \end{aligned}$$

Multiplying a Binomial by a Trinomial (A) Answers
Simplify each expression.
1. $(6x^2 - 7)(9x^2 - 7x - 3)$ $= 54x^4 - 51x^3 - 117x^2 - 21x + 21$
2. $(x^2 + 5x)(5x^2 - 4x - 5)$ $= 5x^4 + 21x^3 - 25x^2 - 25x$
3. $(2x^2 - 9)(8x^2 - 2x^2 + 3x^2)$ $= 61x^4 - 95x^3 + 26x^2 - 27x^3$
4. $(3x^2 - 4)(2x^2 + 5x - 2)$ $= 6x^4 + 10x^3 - 13x^2 - 8x + 8$
5. $(-8x^2 - 6x)(-9x^2 - 2x^2 + 7)$ $= 75x^4 + 36x^3 - 108x^2 - 42x$
6. $(-5x^2 - 8)(9x^2 - x^2 - 2)$ $= -45x^4 - 8x^3 + 110x^2 + 16x$
7. $(-4 + 8)(-2x^2 - 8x - 1)$ $= -20x^2 - 80x - 8$
8. $(-7x^2 - 6x)(8x^2 - 7x + 4)$ $= -56x^4 + x^3 + 11x^2 - 28x$
9. $(x^2 + 3x)(6x^2 - 4x^2 + 4)$ $= 6x^4 + 14x^3 - 8x^2 + 12x$
10. $(3x^2 + x^2)(5x^2 - 7x^2 - 3)$ $= 8x^4 - 10x^3 - 15x^2 - 3x$

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C4

P Benson/C Pryde

Harder Binomial Expansion

For questions 1 to 6, find the binomial expansion in ascending powers of x up to and including x^5 . State also the range of values for which the expansion is valid

- $\frac{1}{2+x}$
- $\sqrt{4+2x}$
- $\frac{1}{(4-x)^2}$
- $\sqrt{9+x}$
- $\frac{1}{\sqrt{2+x}}$
-

7. Find the first three terms in the expansion of . State the value of x for which it is valid.

8. Show that the expression may be written as .

9. Find the first three terms in the expansion of stating the values of x for which the expansion is valid.

Binomial Expansion

updated: Jan 2008

Binomial expansion worksheet 1 answer key.

Binomial expansion for $(x+a)^n$ is $nc_0x^n + nc_1x^{n-1}a + nc_2x^{n-2}a^2 + \dots + nc_{n-1}x a^n$ (If X is a set containing n elements, then we know that nCr is the number of subsets of X having exactly r elements. So by adding nCr for $r = 0, 1, 2, \dots, n$ we get the number of subsets of X . So by using the above identity we see that a set of n elements has 2^n subsets. (1) Expand $(1+2x)^3 - (3x)^3$ Solution (1) $(2x^2 - 3x) + (2x^2 + 3x) - (3x)^3$ Solution (2) Compute (i) 1024 (ii) 994 (iii) 97 Solution (3) Using binomial theorem, indicate which of the following two number is larger: (i) 0.11000000 , 1.0000 Solution (4) Find the coefficient of x^{15} in $(x^2 + (1/3x))^{10}$ Solution (5) Find the coefficient of x^6 and the coefficient of x^2 in $(x^2 - (1/3x))^6$ Solution (6) Find the coefficient of x^4 in the expansion of $(1 + x)^{15}(x^2 + 1/x)^5$ Solution (7) Find the constant term of $(2x^3 - (1/3x^2))^5$ Solution (8) Find the last two digits of the number 3600 Solution (9) If n is a positive integer, show that $9n+1 - 8n - 9$ is always divisible by 64 . Solution (10) If n is an odd positive integer, prove that the coefficients of the middle terms in the expansion of $(x+y)^n$ are equal. Solution (11) If n is a positive integer and r is a non negative integer, prove that the coefficients of x^r and x^{n-r} in the expansion of $(1+x)^n$ are equal Solution (12) If a and b are distinct integers, prove that $a-b$ is a factor of $a^n - b^n$, whenever n is a positive integer. [Hint: write $a^n - b^n = (a-b)(a^{n-1} + a^{n-2}b + \dots + b^{n-1})$ and expand] Solution (13) In the binomial expansion of $(a+b)^n$, the coefficients of the 4th and 13th terms are equal to each other, find n . Solution (14) If the binomial coefficients of three consecutive terms in the expansion of $(a+x)^n$ are in the ratio $1 : 7 : 42$, then find n . Solution (15) In the binomial coefficients of $(1+x)^n$, the coefficients of the 5th, 6th and 7th terms are in AP. Find all values of n . Solution (16) Solution Apart from the stuff given above, if you need any other stuff in math, please use our google custom search here. Kindly mail your feedback to v4formath@gmail.comWe always appreciate your feedback. ©All rights reserved. onlinemath4all.com Last updated22 February 2018This worksheet bundle contains questions on binomial expansion for positive integer power index n . Detailed typed answers are provided to every question. I hope you find it useful. You can get more worksheets on many topics, mix and match, with detailed step-by-step solutions at Commons "Sharealike"Select overall rating(no rating)Your rating is required to reflect your happiness.Write a reviewUpdate existing reviewIt's good to leave some feedback.Something went wrong, please try again later.Exactly what I was looking for.Thank you.Empty reply does not make any sense for the end userGood questions, however my mistakes in the answers of worksheet 2.Empty reply does not make any sense for the end userThank youEmpty reply does not make any sense for the end userVery helpful resource. Thanks for sharing Empty reply does not make any sense for the end userExactly what I was looking for!Empty reply does not make any sense for the end userReport this resource to let us know if it violates our terms and conditions. Our customer service team will review your report and will be in touch. These worksheets introduce a new notation for writing a combination, but overall the syntax used in these worksheets should look familiar to students who have a background in algebra. There are 6 worksheets in this set. Students will use the binomial theorem to expand mathematical expressions. This set of worksheets contains lessons, step-by-step solutions to sample problems, both simple and more complex problems, a review, and a quiz. It also includes ample worksheets for students to practice independently. Most worksheets contain between eight and ten problems. When finished with this set of worksheets, students will be able to use the Binomial Theorem. These worksheets explain how to use the Binomial Theorem to expand mathematical expressions. Sample problems are solved and practice problems are provided. Page 2 [Home] This worksheet is a PDF document. You will need Adobe Acrobat Reader to view the worksheet or answers. Each worksheet may consist of several pages, scroll down to the see everything.

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