

Algebra

Applied Mathematics

Calculus and Analysis

Discrete Mathematics

Foundations of Mathematics

Geometry

History and Terminology

Number Theory

Probability and Statistics

Recreational Mathematics

Topology

Alphabetical Index

Interactive Entries

Random Entry

New in MathWorld

MathWorld Classroom

About MathWorld

Contribute to MathWorld

Send a Message to the Team

MathWorld Book

Wolfram Web Resources »

13,776 entries  
Last updated: Wed Oct 27 2021

Created, developed, and  
nurtured by Eric Weisstein  
at Wolfram Research

Calculus and Analysis > Series > General Series >

# Negative Binomial Series

 [DOWNLOAD](#)  
[Wolfram Notebook](#)

The series which arises in the binomial theorem for negative integer  $-n$ .

$$(x+a)^{-n} = \sum_{k=0}^{\infty} \binom{-n}{k} x^k a^{-n-k} \tag{1}$$

$$= \sum_{k=0}^{\infty} (-1)^k \binom{n+k-1}{k} x^k a^{-n-k} \tag{2}$$

for  $|x| < a$ .

For  $a = 1$ , the negative binomial series simplifies to

$$(x+1)^{-n} = 1 - nx + \frac{1}{2}n(n+1)x^2 - \frac{1}{6}n(n+1)(n+2)x^3 + \dots \tag{3}$$

**SEE ALSO:**  
[Binomial Series](#), [Binomial Theorem](#)

**CITE THIS AS:**  
[Weisstein, Eric W.](#) "Negative Binomial Series." From [MathWorld](#)--A Wolfram Web Resource.  
<https://mathworld.wolfram.com/NegativeBinomialSeries.html>

arithmetic series

THINGS TO TRY:

- = arithmetic series
- = beta distribution
- = curl  $[-y/(x^2+y^2), -x/(x^2+y^2)]$

Wolfram|Alpha  
Online  
Integral  
Calculator

|

TRY IT NOW

## Wolfram Web Resources

**Mathematica »**

The #1 tool for creating  
Demonstrations and anything  
technical.

**Wolfram|Alpha »**

Explore anything with the first  
computational knowledge engine.

**Wolfram Demonstrations Project »**

Explore thousands of free applications  
across science, mathematics,  
engineering, technology, business, art,  
finance, social sciences, and more.

**Computerbasedmath.org »**

Join the initiative for modernizing math  
education.

**Online Integral Calculator »**

Solve integrals with Wolfram|Alpha.

**Step-by-step Solutions »**

Walk through homework problems step-  
by-step from beginning to end. Hints help  
you try the next step on your own.

**Wolfram Problem Generator »**

Unlimited random practice problems  
and answers with built-in Step-by-  
step solutions. Practice online or  
make a printable study sheet.

**Wolfram Education Portal »**

Collection of teaching and learning  
tools built by Wolfram education  
experts: dynamic textbook, lesson  
plans, widgets, interactive  
Demonstrations, and more.

**Wolfram Language »**

Knowledge-based programming for  
everyone.

 [Contact the MathWorld Team](#)

© 1999-2021 Wolfram Research, Inc. | [Terms of Use](#)