

Reference: [Binomial theorem - Wikipedia](#)

$$\sqrt{1+x} = 1 + \frac{1}{2}x - \frac{1}{8}x^2 + \frac{1}{16}x^3 - \frac{1}{128}x^4 + \dots \forall |x| < 1$$

$$\frac{d}{dx}\sqrt{1+x} = \frac{1}{2} - \frac{1}{4}x + \frac{3}{16}x^2 - \frac{1}{32}x^3 + \dots$$

$$\int \sqrt{1+x} dx = x + \frac{1}{4}x^2 - \frac{1}{24}x^3 + \frac{1}{64}x^4 - \frac{1}{640}x^5 + \dots + C$$

$$\frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5 + \dots \forall |x| < 1$$

$$\frac{d}{dx} \frac{1}{1+x} = -1 + 2x - 3x^2 + 4x^3 - 5x^4 + \dots$$

$$\int \frac{dx}{1+x} = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \frac{1}{4}x^4 + \frac{1}{5}x^5 + \dots + C$$

$$\frac{1}{(1+x)^s} = \sum_{k=0}^{\infty} \binom{s+k-1}{k} (-1)^k x^k \forall |x| < 1$$

$$\frac{d}{dx} \frac{1}{(1+x)^s} = \sum_{k=1}^{\infty} \binom{s+k-1}{k} \frac{(-1)^k}{k} x^{k-1}$$

$$\int \frac{dx}{(1+x)^s} = \sum_{k=0}^{\infty} \binom{s+k-1}{k} \frac{(-1)^k}{k+1} x^{k+1} + C$$

$$\frac{1}{(1-x)^s} = \sum_{k=0}^{\infty} \binom{s+k-1}{k} x^k \forall |x| < 1$$

$$\frac{d}{dx} \frac{1}{(1-x)^s} = \sum_{k=1}^{\infty} \binom{s+k-1}{k} \frac{1}{k} x^{k-1}$$

$$\int \frac{dx}{(1-x)^s} = \sum_{k=0}^{\infty} \binom{s+k-1}{k} \frac{1}{k+1} x^{k+1} + C$$

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C:\Users\james\source\repos\BinomialTheoremResults\Debug\BinomialTheoremResults.exe

== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit 1
enter highest power n 4
x 0.1
f(x) = 1.04881
s(x) = 1.04762
d(x) = 0.0011901
== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit 1
enter highest power n 8
x 0.1
f(x) = 1.04881
s(x) = 1.04762
d(x) = 0.0011898
== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit
```

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== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit 2
enter highest power n 4
x -0.1
f(x) = 0.9
s(x) = 1.1111
d(x) = 0.2111
== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit 2
enter highest power n 8
x -0.1
f(x) = 0.9
s(x) = 1.11111
d(x) = 0.211111
== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit
```

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C:\Users\james\source\repos\BinomialTheoremResults\Debug\BinomialTheoremResults.exe
== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit 3
enter highest power n 4
s - exponent 1
x 0.1
f(x) = 0.909091
s(x) = 0.9091
d(x) = 9.09091e-06
== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit 4
enter highest power n 4
s - exponent 1
x 0.1
f(x) = 1.11111
s(x) = 1.1111
d(x) = 1.1111e-05
== Menu ==
1 Function #1
2 Function #2
3 Function #3
4 Function #4
option (1 - 4), 0 to quit
```