ARQMath

Answer Retrieval for Questions on Math

https://www.cs.rit.edu/~dprl/ARQMath

#ARQMath

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(Presented by Han-Chin Shing)

— Goals —

Advance techniques for
math-aware search and semantic analysis
of mathematical notation and text

— Collection —

Math Stack Exchange community QA forum
(~1.1 million questions)

Formulas represented using:

- appearance encoding (**LaTeX, Presentation MathML**)
- semantic encoding (**Content MathML**)

ARQMath

Task 1: Find Answers to Math Questions

Given a posted question as a query
Search previous answer posts
Return relevant answers

Query

How can I evaluate $\sum_{n=0}^{\infty}(n+1)x^n$?

Asked 8 years, 5 months ago Active 4 months ago Viewed 34k times

384

How can I evaluate

$$\sum_{n=1}^{\infty}\frac{2n}{3^{n+1}}$$

146

I know the answer thanks to Wolfram Alpha, but I'm more concerned with how I can derive that answer. It cites tests to prove that it is convergent, but my class has never learned these before so I feel that there must be a simpler method.

In general, how can I evaluate

$$\sum_{n=0}^{\infty}(n+1)x^n?$$

sequences-and-series convergence power-series faq

edited Sep 24 '17 at 12:09
Parcly Taxel
51.7k ● 13 ■ 80 ▲ 120

asked Apr 3 '11 at 21:41
Backus
2,072 ● 3 ■ 12 ▲ 8

Search Results

1

No need to use Taylor series, this can be derived in a similar way to the formula for geometric series. Let's find a general formula for the following sum:

$$S_m = \sum_{n=1}^{m} nr^n.$$

...

2

It is equivalent to $x(x+1)(x+5)(x+6)+96=0$

Now

...

$$(x^2+6x)(x^2+6x+5)+96=0$$

3

If you want a solution that doesn't require derivatives or integrals, notice that

$$\begin{aligned}1+2x+3x^2+4x^3+\cdots = 1+&x+x^2+x^3+\ldots\\ +&x+x^2+x^3+\ldots\\ +&x^2+x^3+\ldots\end{aligned}$$

...

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Task 2: Formula Search

Given a formula query from a question
Search formulas extracted from question and answer posts
Return relevant formulas

Query

$$\sum_{n=0}^{\infty}(n+1)x^n$$

Search Results

1 $$\sum_{n=0}^{\infty}(n+1)x^n$$

2 $$\sum_{n=0}^{\infty}(n+1)x^n$$

3 $$\int_0^1 \frac{\ln(x+1)}{x^2+1}dx$$

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Please join us! Feedback welcome!

Send Email to: **rxzvcs@rit.edu**

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