

Re: (Discrete Math – Induction) 'Formula Differentiation'

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- *From:* quasi <quasi@xxxxxxxx>
 - *Date:* Mon, 31 Mar 2008 00:05:48 -0500
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On Sun, 30 Mar 2008 20:48:11 -0700 (PDT), "almeidabatista@xxxxxxxx" <almeidabatista@xxxxxxxx> wrote:

On 30 mar, 23:45, quasi <quasi@xxxxxxxx> wrote:

On Sun, 30 Mar 2008 18:30:51 -0700 (PDT), "almeidabati...@xxxxxxxx" <almeidabati...@xxxxxxxx> wrote:

<almeidabati...@xxxxxxxx> wrote:

Hi all! I've got this problem in my set:

$$1 + 2q + 3q^2 + \dots + nq^{(n-1)} = [1 - (n+1)q^n + nq^{(n-1)}] / [(1 - q)^2], q \neq 1.$$

Estabilish [the formula above] by differentiating the expansion of the formula for the sum of a geometric progression.'

I've been thinking with this one all day, no clue on how to start.

ANY hints on how the derivative of the sum of terms of a G.P will get into this are welcome.

- (1) Find an antiderivative of the LHS.
- (2) Look at the result -- do you recognize it?
- (3) Based on the answer to (2), use a known formula to simplify the

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result.

(4) Now differentiate the simplified result,

quasi

Hmmmmmm! This algebric trick would never happen to me wouldn't it be your answer! Thanks a lot!

Just to be sure, the only 'induction' involved in the solution is finding the derivative of the summation?

Unless you're required to be ultra-formal, there's no need for induction. Just show the pattern, making clear that it works, term by term. If you want, you can also show explicitly what happens to the k'th term, where k is an arbitrary index variable, left undetermined.

quasi

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