

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

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On Mar 30, 6:30 pm, "almeidabati...@xxxxxxx" <almeidabati...@xxxxxxx> wrote:

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

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

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

I've been thinkering

Well, you can be 'tinkering' or 'thinking', but 'thinkering' is a new one on me. I like it!

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.

Write down the formula for the sum of a geometric progression; the left-hand-side should be $1 + q + q^2 + \dots + q^n$, while the right-hand-side should be the formula you get after summing (that is, $[1 - q^{(n+1)}] / (1 - q)$). Now differentiate the left-hand-side. What do you get? Differentiate the right-hand-side. What do you get? You see, this just carries out the instructions that you were given in the question.

R.G. Vickson