PRINT Your Name:____________________

Quiz 13 — April 13, 2012 – Section 8 – 10:10 – 11:00

Remove everything from your desk except a pencil or pen.

Write in complete sentences.
The quiz is worth 5 points.

Find the sum of $\sum\limits_{n=2}^{\infty} n(n-1)x^n$ for $|x| < 1$.

Answer. We know that $\sum\limits_{n=0}^{\infty} x^n = \frac{1}{1-x}$ for $|x| < 1$. Take the derivative to get $\sum\limits_{n=0}^{\infty} nx^{n-1} = \frac{1}{(1-x)^2}$ for $|x| < 1$. Take another derivative to get: $\sum\limits_{n=0}^{\infty} n(n-1)x^{n-2} = \frac{2}{(1-x)^3}$ for $|x| < 1$. Multiply by x^2 to get: $\sum\limits_{n=0}^{\infty} n(n-1)x^n = \frac{2x^2}{(1-x)^3}$ for $|x| < 1$. Of course, when $n = 0$ or $n = 1$, then $n(n-1)x^n$ is zero; so $\sum\limits_{n=2}^{\infty} n(n-1)x^n = \frac{2x^2}{(1-x)^3}$ for $|x| < 1$.