PRINT Your Name:____________________

**Quiz 13 — April 18, 2014 – Section 7 – 12:00 – 12:50**

**Remove everything from your desk except this page and a pencil or pen.**
The solution will be posted soon after the quiz is given.

$\boxed{\text{Circle}}$ your answer. **Show your work. Your work must be correct and coherent.**
The quiz is worth 5 points.

Find the sum of $\sum\limits_{n=1}^{\infty} nx^n$ 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 $|x| < 1$. Multiply by $x$ to get: $\sum\limits_{n=0}^{\infty} nx^n = \frac{x}{(1-x)^2}$ for $|x| < 1$. Of course, when $n = 0$, $nx^n$ is zero; so $\sum\limits_{n=1}^{\infty} nx^n = \frac{x}{(1-x)^2}$ for $|x| < 1$.