Quiz 1. Write your answers in the space provided to the right of each question. If you need extra space, you can write on the back, but please indicate that you have used extra space and number the work clearly. (3+3+8+8+8 = 30 points)

1. Write your full name.	Key
2. Write your UA email.	
3. Simplify $9^{log_3 N+2} - 4$ completely. Show your work.	$9^{\log_3 N+2} - 4 = 9^2 \cdot 9^{\log_3 N} - 4$ $= 81 \cdot (3^2)^{\log_3 N} - 4$ $= 81 \cdot N^2 - 4$ $= \boxed{81N^2 - 4}$
4. Solve $\sum_{k=5}^{15} (3k - 1)$. Give your answer as a single integer. Show your work.	$\sum_{k=5}^{15}(3k-1) = \sum_{k=1}^{15}(3k-1) - \sum_{k=1}^{4}(3k-1)$ $= 3\sum_{k=1}^{15} k - \sum_{k=1}^{15} 1 - 3\sum_{k=1}^{4} k + \sum_{k=1}^{4} 1$ $= 3\left(\frac{15 \cdot 16}{2}\right) - 15 - 3\left(\frac{4 \cdot 5}{2}\right) + 4 = 360 - 15 - 30 + 4$ $= \boxed{319}$
5. Solve $3 + 12 + 48 + \ldots + N$. Simplify completely. Show your work.	$3 + 12 + 48 + \ldots + N = 3(1 + 4 + 16 + \ldots + N/3)$ $= 3\sum_{k=0}^{\log_4 N/3} 4^k = 3\left[\frac{4^{\log_4 N/3 + 1} - 1}{3}\right]$ $= 4(N/3) - 1$ $= \boxed{\frac{4N}{3} - 1}$