Bilkent University
Department of Mathematics

Problem Of The Month

May 2006

Problem: Find a_{2006}, if $a_1 = 1$, and $\dfrac{a_n}{n+1} = \dfrac{\sum_{i=1}^{n-1} a_i}{n-1}$.

Solution: Let us define $S_n = \sum_{i=1}^{n} a_n$. Then $S_n = S_{n-1} + a_n = S_{n-1} + \dfrac{n+1}{n-1} S_{n-1} = \dfrac{2n}{n-1} S_{n-1}$ and $S_1 = 1$. Therefore, $S_n = \dfrac{2^{n-1} n!}{(n-1)!} = 2^{n-1} n$. Finally, $a_{2006} = S_{2006} - S_{2005} = 2^{2005} 2006 - 2^{2004} 2005 = 2^{2004} 2007$.