Week 18  (1/13/03)

Distribution of primes

Let $P(N)$ be the probability that a randomly chosen integer, $N$, is prime. Show that

$$P(N) = \frac{1}{\ln N}.$$  

Note: Assume that $N$ is very large, and ignore terms in your answer that are of subleading order in $N$. Also, make the assumption that the probability that $N$ is divisible by a prime $p$ is exactly $1/p$ (which is essentially true, for a large enough sample size of numbers).