

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).