

From Bob to Alice – Part 2

Below are a few results from the field of number theory. If you assume these results to be true, how does that change your answer to Question 3?

Theorem 1. If a and b are relatively prime, then there exist numbers s and t such that $as + bt = 1$.

Theorem 2. Let p and q be distinct primes. For any integer a ,

$$a^{k(p-1)(q-1)+1} \equiv a \pmod{pq}$$

where k is any positive integer.

Theorem 3. The number of prime numbers less than or equal to n is approximately equal to $\frac{n}{\ln n}$ for large values of n .