Integral Encryption

"IntCrypt"

Henry Samuelson

I. ENCRYPTING

If I want to encrypt the message "AB", I have I have to evaluate an integral for each letter, the bounds will become the encrypted message. Say I decide my key will be: x^2—on the last problem the key was a shift of 13—then to encrypt the first letter which is "A" it will look like this:

$$\int_0^n x^2 = A = 1$$

Given the letter being encrypted holds a value of it's numeric counterpart, so {A,B,C,…}={1,2,3,…}. This means we need to find what *n* makes our integral true. We can take an indefinite integral first and then solve for *n.*

$$\frac{n^3}{3} - \frac{(0)^3}{3} = 1$$

$$x^3 = 3$$

$$x = \sqrt[3]{3}$$

Now that we have solved the bounds we have the first part of our encrypted message. The bounds are the encrypted message. So far, our message reads: $\{0, \sqrt[3]{3}\}$ which if someone knows the key (x^2) they can enter the bounds and read the message "A". Encrypting the second letter is the same, but the bottom bound is the last letters top bound. To solve for the next letter "B" one would use:

$$\int_{\sqrt[3]{3}}^n x^2 = B = 2$$

II. DECRYPTING

Decrypting is much similar than encrypting, and all you have to do after all is decrypt the message to move to the next challenge. If you know key all one must do is plug the encrypted message in as bounds and solve. This will yield the original method. Of course, this is hard to do, if you don't know the key. This is not an impossible to crack and has been cracked already by someone.