Assignment 26

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1

First find $\phi(N)$: $(p-1)(q-1) = 504$. This is the Euler Totient Function; we'll call it n for short. Given that $e = 5$. The smallest x such that $5x \equiv 1 (\text{mod } 504)$ is $x = 101$. Thus $\mathbf{d = 101}$. Pretty simple.

2

Encrypting 55 is pretty straightforward. Given $m^e (\text{mod } n)$, we have $55^5 (\text{mod } 504) = 55$. If that doesn't seem right, we can reverse it given $m^d (\text{mod } 504)$: $55^{101} (\text{mod } 504) = 55$.

3

Given the above, this is super simple. $189^101 (\text{mod } 504) = 189$. We can confirm this odd result by $189^5 (\text{mod } 504) = 189$.