

RSA - generating the key pair

1. Pick p and q two large prime numbers and calculate $n = p \cdot q$
(see primality tests)
2. Compute $z = (p-1) \cdot (q-1)$
3. Pick a prime number $e < z$ such that e and z are relative primes
➔ (e, n) is the **public key**
4. Solve the linear equation $e * d = 1 \pmod{z}$ to find d
➔ (d, n) is the **private key**
however p and q must be kept secret too

RSA - encryption and decryption

Given $K_p = (e, n)$ and $K_s = (d, n)$

➡ Encryption : $E_{kp}(m) = m^e \bmod n = c$

➡ Decryption : $D_{ks}(c) = c^d \bmod n = m$

➡ **$(m^e)^d \bmod n = (m^d)^e \bmod n = m$**