**Problem 3**

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**RSA encryption scheme**

**Given:**

Public key(n, e) = (15151, 17)

Ciphertext = y = 832

* **Find the prime factorization of n**

n = 15151 = p \* q = 109 \* 139

The prime factorizations are p = 109 and q = 139

* **Compute ϕ(n)**

ϕ(n) = (p-1)(q-1) = 108 \* 138 = 14904

* **Finding the private key *d***

Know that e = 17

To find *d,* we use the formula:

e-1 mod (ϕ(n))

d = 17-1 mod 14904 = 6137

* **Decrypting ciphertext *y***

You get a plaintext by decrypting the ciphertext

plaintext = yd mod n

8326137 mod 15151 = 1781