Course Project

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Problem 1

Answer: 115

As explained, the ciphertext can be computed as follows:

$$c = m^e \bmod n. \tag{1}$$

In this case, we have $m = 15$, $e = 7$ and $n = 143$. Hence:

$$c = 15^7 \bmod 143 = 115. \tag{2}$$

Problem 2

Answer:
▷ 2
▷ 61
▷ 461

215 is not prime, since it is clearly divisible by 5.

Problem 3

Answer:
▷ $122 = 2 \cdot 61$
▷ $922 = 2 \cdot 461$

The other two integers are the product of three prime numbers: $13115 = 5 \cdot 43 \cdot 61$, $99115 = 5 \cdot 43 \cdot 461$.

Problem 4

Answer: 460

$$\varphi(922) = \varphi(2 \cdot 461) = (2-1)(461-1) = 460 \tag{3}$$