Exercise 3

$k = 4$

$c = 2003$

$\delta = 24$

$n = 6$

$x = 43$

1. $\varphi(4) = 2$

$\varphi(2003) = 2002$

$\varphi(24) = \varphi(3) \cdot \varphi(8) = 2 \cdot 4 = 8$

$\varphi(6) = \varphi(2)\ \varphi(3) = 2$

$\varphi(43) = 42$

3. $43^{28} \bmod 2003$

$28 = 11100$

$c = 1 \quad 1^2 \cdot 43 \bmod 2003$

$c = 43 \quad 1^2 \cdot 43 \bmod 2003$

$c = 1390 \quad 1^2 \cdot 43 \bmod 2003$

$c = 1869 \quad 1^2 \bmod 2003$

$c = 1932 \quad 1^2 \bmod 2003 \quad \underline{c = 1035}$