1.

a)

$a \equiv b(mod\ n) \Rightarrow n|a-b \Rightarrow n|-1(a-b) \Rightarrow n|b-a \Rightarrow b \equiv a(mod\ n)$

b)

$a \equiv b(mod\ n)$ and $b \equiv c(mod\ n) \Rightarrow$
$n|a-b$ and $n|b-c \Rightarrow n|(a-b)+(b-c) \Rightarrow n|a-c \Rightarrow a \equiv c(mod\ n)$

2.

a) -1082
b)-571
c)550

3.

a) $x^3+1=(x+1)(x^2-x+1)$ reducible
b) unreducible
c) unreducible

4.

a) 1 b) $x+1$

5.

$H(K|C)=H(K)+H(P)-H(C)$
$H(X)=-\sum_{i=1}^{n} p_i log_2 p_i$
$H(K)=H(X)|X=\frac{1}{2},\frac{1}{4},\frac{1}{4}=1.5$
$H(K)=H(X)|X=\frac{1}{3},\frac{1}{6},\frac{1}{2}=1.459$
$P_C(C_i)=\sum_{\forall e_{k_i}(p_j)=C_i} P(k_i)*P(p_j)$
$H(C)=H(X)|X=\frac{7}{24},\frac{5}{12},\frac{1}{8},\frac{1}{6}=1.851$
$H(K)+H(P)-H(C)=1.108$