PROBLEMS ON THE CONGRUENCE RELATION

III.17 Given three piles of coconuts, if 1/5 of the total number of coconuts is in the first pile, several sevenths are in the second pile, and 12 coconuts are in the third pile, what is the total number of coconuts?
(a) 105 (b) 120 (c) 140 (d) 420 (e) 700

IV.27 For positive integers A and B let A mod B denote the remainder when A is divided by B (e.g. 23 mod 4 = 3). If N = abc is a 3 digit number, where a,b,c are digits, then c =
(a) (N mod 100) mod 10
(b) N mod 1000 - N mod 100 + N mod 10
(c) N mod 100 + N mod 10
(d) (N/N mod 100)/N mod 10
(e) (N mod 100)x(N mod 10)

V.28 Given a pile of x coconuts, if the pile is subdivided into 3 equal piles then there is 1 coconut left over. If it is subdivided into 5 equal piles then there are 2 coconuts left over, and if it is divided into 7 equal piles then there are 3 coconuts left over. If x < 100 then the sum of the digits of the integer x is
(a) 3 (b) 4 (c) 6 (d) 7 (e) 9

VI.10 If for positive integers M and N, M mod N is the remainder from the division of M by N then
46 mod ((60 mod 31) mod 11) equals
(a) 13 (b) 9 (c) 8 (d) 4 (e) 0.

VII.28 If M,N are integers then M = N mod D provided M - N is divisible by D. Given that M = N mod D and P = Q mod D then of (I) M + P = (N + Q) mod D (II) MP = NQ mod D (III) MQ = NP mod D (IV) MN = PQ mod D which are not necessarily true? (a) II,III (b) I,IV (c) III only
(d) IV only (e) all must be true

VIII.29 Let M,N,P be positive integers, and M mod N be the remainder of the division of M by N. If M mod N = 3 and N mod P= 5 then M mod P could be which of the following numbers? (a) 15 (b) 19 (c) 27 (d) 2 (e) 13

X.8 For positive integers by a mod c is meant the division of a by b gives a remainder c. Given x mod 7 = 2, y mod 7 = 5, and z mod 7 = 3 then xyz mod 7 = (a) 0 (b) 1 (c) 2
(d) 3 (e) 4