Elementary Number Theory

1.) How many positive integers less than 100 have a remainder of 3 upon division by 7?

tsk[a].)10 **tsk[a].)**11 **tsk[a].)**12
tsk[a].)13 **tsk[a].)**14

2.) For every natural number n, $\tau(n)$ is the number of positive divisors of n. Evaluate $\tau^3(12)$.

tsk[a].)1 **tsk[a].)**2 **tsk[a].)**3
tsk[a].)4 **tsk[a].)**6

3.) p and q are prime numbers greater than 2. which of the following statements must be true?

I $p + q$ is even.
II pq is odd.
III $p^2 - q^2$ is even

a.) I only **b.)** II only
c.) I and II only **d.)** I and III only
e.) I, II, and III

4.) How many integers less than 1000 are such that the remainder upon division by each of 2, 3, 4, 5, 6, and 7 is 1?

tsk[a].)0 **tsk[a].)**1 **tsk[a].)**2
tsk[a].)3 **tsk[a].)**4

5.) n is a positive integer. Which of the following quantities is divisible by 3?

I $n^3 - 1$
II $n^3 + 1$
III $n^3 + 2n$

a.) I only **b.)** II only
c.) I and II only **d.)** II and III only
e.) I, II, and III