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## 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. Consider the following statements:

**tsk[R]**  $p + q$  is even.

**tsk[R]**  $pq$  is odd.

**tsk[R]**  $p^2 - q^2$  is even

Which of the following must be true?

**tsk[a].)I only**

**tsk[a].)II only**

**tsk[a].)I and II only**

**tsk[a].)I and III only**

**tsk[a].)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. Consider the following quantities:

**tsk[R]**  $n^3 - 1$

**tsk[R]**  $n^3 + 1$

**tsk[R]**  $n^3 + 2n$

Which is divisible by 3?

**tsk[a].)I only**

**tsk[a].)II only**

**tsk[a].)I and II only**

**tsk[a].)II and III only**

**tsk[a].)I, II, and III**