California State University Sacramento - Math 101

Homework Assignment 2

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1. Find the number of ways to choose a pair $\{a, b\}$ of distinct numbers from the set $\{1, 2, ..., 50\}$ such that

(i) $|a - b| = 5$; (ii) $|a - b| \leq 5$.

10. Find the number of common positive divisors of 10^{40} and 20^{30}.

11. In each of the following, find the number of positive divisors of n (inclusive of n) which are multiples of 3:

(i) $n = 210$; (ii) $n = 630$; (iii) $n = 151200$.

12. Show that for any $n \in \mathbf{N}$, the number of positive divisors of n^2 is always odd.

5) Find the number of ordered pairs (x, y) of integers such that $x^2 + y^2 \leq 4$.
Remark: This problem is similar to Example 1.1.2.

6) Find the number of sequences $a_1a_2a_3$ of length 3 where $a_i \in \{0, 1, 2, 3, 4\}$.
Remark: This is a special case of Example 1.1.4.

7) Let $X = \{1, 2, \ldots, 10\}$ and let

$$S = \{(a, b, c) : a, b, c \in X, a < b \text{ and } a < c\}.$$

Find $|S|$.
Remark: This problem is similar to Example 1.1.6.