The sum of the digits in the unit place of all numbers formed with the help of $a_1, a_2, a_3, \dots, a_n$ taken all at a time is $= \boxed{(n-1)!\,(a_1+a_2+\dots+a_n)}$

repetition of digits not allowed

The sum of all digit numbers that can be formed using the digits $a_1, a_2, \dots, a_n$ taken all at a time is $= (n-1)!\,(a_1+a_2+\dots+a_n)\,\frac{10^n-1}{9}$

repetition of digits not allowed.

Out of n non-concurrent and non-parallel straight lines points of intersection are $\binom{n}{2}$

Out of n points, the number of straight lines are (when no 3 are collinear) $\binom{n}{2}$

If out of n points m are collinear, then number of st. lines $\binom{n}{2}-\binom{m}{2}+1$

In a polygon the total no of diagonals out of n points (no 3 are collinear)

$$\frac{n(n-3)}{2}$$

No. of triangles formed out of n points
( )

No. of triangles out of n points in which m are collinear $\binom{n}{3}-\binom{m}{3}$

No. of parallelograms in two systems of parallel lines (when 1st set contains m parallel lines and 2nd set " n " ") : $\binom{n}{2}\binom{m}{2}$

No of squares in two system of ⊥ parallel lines ( ) = $\sum_{r=1}^{m-1}(m-r)(n-r)$; (m

No. of ways of selecting 1 or more items from a group of n distinct items is $2^n - 1$

The total no. of ways of selecting one or more items from p identical items of one kind, q identical items of second kind, r identical items of 3rd kind and n different items is $(p+1)(q+1)(r+1)2^n - 1$.

Suppose $n = p_1^{n_1} p_2^{n_2} \cdots p_k^{n_k}$

Then divisors of $n = \boxed{(n_1+1)\cdots(n_k+1)}$

" " n (other than 1 and n) $= \boxed{(n_1+1)\cdots(n_k+1)-2}$

Sum of the divisors $= \left(\dfrac{p_1^{n_1+1} - 1}{p_1 - 1}\right) \cdots \left(\dfrac{p_k^{n_k+1} - 1}{p_k - 1}\right)$

No. of ways in which n can be resolved as a product of two factors is

$\frac{1}{2}(n_1+1)(n_2+1)\cdots(n_k+1)$ $n \neq$ perfect square

~~No. of ways in whic~~

$\frac{1}{2}\left[(n_1+1) * (n_2+1)\cdots(n_k+1) + 1\right]$ $n =$ " "

If n pigeons are assigned to m pigeonholes and $m<n$. Then one of the pigeonholes must contain atleast $\left[\frac{n-1}{m}\right]+1$ pigeons.

If $p_1+p_2+p_3$ things are $\ni$ p_1 things are a[...] p_2 things are alike and p_3 things are all different then number of selections of any r things out of $p_1+p_2+p_3$ things

$= \text{coefficient of } x^r \text{ in } (1+x+\cdots+x^{p_1})(1+x+\cdots+x^{p_2})(1+\ldots$

SOURCE: GITHUB.COM/SOURAVSTAT