LIS – 01/10/2024

Law of Indices – a^1, a^2, $a^{1/2}$, $a^{1/4}$

$$a^i \cdot a^j = a^{(i+j)}$$

(present in Anuyog dwar sutra)

Vikalpa

Permutations & Combinations

(present in Bhagwati sutra)

- 5 senses – sight, hear, smell, taste, touch

  PnC was req. to form smaller groups of these 5 senses.

- Selection out of a given no. of men & women

- Formulae found in Bhagwati Sutra

  $\binom{n}{1} = n$, $\binom{n}{2} = \frac{n(n-1)}{2 \cdot 1}$, $\binom{n}{3} = \frac{n(n-1)(n-2)}{3 \cdot 2 \cdot 1}$

  ${}^nP_r = n! / (n-r)!$

- Anuyog dwar sutra & commentary Haemchandra (1089 AD) mention that ${}^{n}P_{r}$ was known.

Thus, credit must be given to Jains for the systematic devp. of this topic

Pingala (~ 300 BC)

His compilation Chandas sutra contains Pascal's Δ.

Conclusion

Unlike Vedas, mathematics seems to be a central part of religion for Jains.

Jain math included geometry motivated by astronomy & PnC.

Indian Mathematicians

Knowledge of history of Indian mathematics is sparse.

Very little is known about the Vedic rishis who composed Sulva sutras as well as Jain mathematicians particularly before ~ 499 AD