VEDIC MATHEMATICS
&
MODERN MATHEMATICS

SATHAPATYA MEASURING ROD
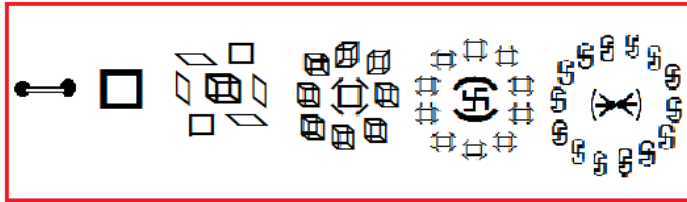
(HYPER CUBES 1 TO 6)
Sixth Week : Day 4
Arithmetic operations

1. Numbers brings us face to face with the basic values of Mathematics

2. Reaching at the features of geometric bodies in terms of values of numbers is the basic attainment.

3. Reaching back from the features of geometric bodies to values of numbers that way amounts to perfection of mathematical systems.

4. Two fundamental Vedic processing systems are (i) Sankhiya Nishtha and (ii) Yoga Nishtha

5. Sankhiya Nishtha presumes the existence of geometric formats and avails artifices of numbers.

6. Yoga Nishtha presumes the existence of artifices of numbers and avail geometric formats of dimensional frames.

7. Sankhiya Nishtha and Yoga Nishtha are complementary and supplementary of each other and their processing steps run parallel to each other

8. Modern mathematical approach to number systems and geometric spaces are independent of each other.

9. The arithmetic operations being worked out by modern systems, that way deserve to be revisited to have proper insight as to why there emerge mathematical knots / problems, as these are being properly designated

10. Starting with counts (counting numbers) and sequential enlargement of numbers domain, as such is by having additional arithmetic operations at each step of enlargement of numbers domain

11. Counts lead us to 'counting numbers', symbolized and designated as [1 (one), 2 (two), 3 (three) and so on]

12. Two (2) as a pair of counts being one (1) count more than 'one', it brings us face to face with count one (1) itself as well being one count more than the previous state of counting

13. This leads us to zero (0) count

14. This extension of counting numbers is accepted as 'whole numbers'. It accepted as a reach within the domain of 'whole numbers'

15. Here the permissibility of two way reach from count one (1) to count two (2) and to count zero (0) brings us face to face with the operation 'one more count', and 'one less count'

16. This will lead us to 'addition' and 'minus' operations.

17. One may have a pause here and have a fresh look at the pair of symbols (+, -).

18. The symbol (+) is availing a pair of lines namely vertical line and horizontal line.

19. The symbol (-1) avails only a single (horizontal line)

20. It would be blissful to revisit these features of the pair of symbols (+, -).

21. It shall be providing us an insight about the features of this pair of symbols and the corresponding operations these represents, being + and – respectively

22. It would be a very blissful exercise to revisit the set ups of these symbols and to appreciate and imbibe the reach of 'one more count' and 'one less count; and then to reach at 'addition' and subtraction operations, in the context of counting numbers.

23. One may have a pause here and take note that it shall be bringing to focus direct counting and reverse counting as mathematical processes.

24. It would further help us extend the counting numbers (including zero) to the domain of integers ---- -4, -3, -2, -1, 0, 1, 2, 3, 4, ----

25. It would further brings us face to face with repeated additions and subtractions of same and of different number of counts at different steps of repeated addition and subtraction operations.

Multiplication as repeated addition

26. $2 = 2 \times 1, 2 + 2 = 4 = 2 \times 2, 2 + 2 + 2 = 6 = 2 \times 3$, --- is the illustration of multiplication values permitting reach as repeated addition.

27. Here, one shall have a pause and have a fresh look at the above features of addition and multiplication operations.

28. One shall be observing as that the above features permit expression as a reach of two units length, as a first step; four units length at the second step; six units length at next step, and so on

29. This will help us comprehend as that the multiplication as repeated addition, amongst others brings us face to face with the features of coverage of whole range of length of a line in terms of addition steps, as well as multiplication operation steps.

30. One may have a pause here and pose to oneself as to whether or not with the multiplication operation as repeated addition steps amounts to sacrificing of some features of multiplication operation?

Multiplication as addition of powers

31. First of all, let us have a fresh look at the symbols for addition and multiplication (+, x)

32. The addition operation (+), as it is, brings us face to face with the set up of two dimensional frame with pair of axes separated by a right angle angular shift and separation from each other.

33. On the other hand when we shall be having look at the set up of symbol for multiplication operation (x) it shall be bringing us face to face with a set up for the pair of axes of a two dimensional frame having angular separation of 45 degree.

34. One may further have a pause here that while set up of addition operation symbol (+) goes parallel to the set up of four directions set up for the space as north, east, south, west

35. One the other hand the set up of multiplication operation symbol (x) brings us face to face with the set up of

the space focusing upon (north – east, east – south, south – west and west – north (sub) direction

36. One of the features of multiplication operation n x m, as such takes us to the format beneath as n value along first axis and m value along the second axis.

37. This format, as such being of a spatial order (square / 2-Space / 2 dimensional frame), the same accordingly is of different values and features than that of format of a line accommodating value for multiplication as repeated addition.

38. Illustratively $1 \times 1 = 1^1 \times 1^1 = 1^1 + 1 = 1^2$ deserves to be visited and revisited time and again.

39. This as such shall be helping us comprehend and appreciate as that the multiplication operation, as such is also of the format and features of addition of powers.

40. One may have a pause here and take note that if multiplication as addition operation is accepted as of format and features of addition at the base, then the multiplication as of powers format shall be accepting format and features of additions of powers at the index.

41. One may have a pause here and permit the transcending mind to glimpse the distinguishing features of addition at base and of addition at the index.

42. This glimpsing and comprehension shall be leading to deep insight about the format and features of addition operation, as well as of multiplication operation and also about the interrelation of addition and multiplication operations.

43. One may further have a pause here and take note that the format of multiplication as repeated addition goes parallel to the linear format (format of a line / base line) and the format and features of multiplication as addition of powers as

index value being of spatial format (2-Space format / 2 dimensional format),

44. Therefore the inter-relationship of this pair of format, as well deserve to be distinctively comprehended.

45. This shall be bringing us face to face with the operations of squaring and of square roots.

46. One may have a pause here and take note that $81 = 9 \times 9 = 9^2 = (3 \times 3) \times (3 \times 3) = 3^2 \times 3^2 = (3^2)^2$, amounts to repeated applications of multiplication operations and also bringing to focus the interrelationship and coordination of the values of multiplication as repeated addition, and multiplication of addition of powers at the index.

47. Further it also would be relevant to note that the reach from value 81 to value 3 as repeated operations of square root, as a reverse operation of squaring / multiplication, would bring into new features while instead of positive whole numbers, there happen to be negative whole numbers.

48. One may further have a pause here and take note that $1 = 1^1 = 1/1 = 1^2 = 1^n = (-1)^2$, would bring to focus the distinguishing features and inter-relationship of (1) and (-1).

49. It also would bring to focus the inter-relationship of multiplication and division as well as of addition and subtraction, and still further of positive and negative powers.

50. The poser here as to the squaring and square root of (-1) and repeated squaring and square root of (-1), will bring us face to face with the situations which the numbers systems, as such have to expose their limitations as far as the basic quadruple arithmetic operations (+, x, -, /)

51. It is here where the modern Mathematics find itself fixed.

52. Vedic Systems transcend through this difficulty with ease with acceptance of the geometric format for the artifices of numbers.
53. The success of Vedic Systems is there by comprehending parallel formats for artifices of numbers as well as of dimensional frames.
54. This being so the existing schooling of Mathematics deserve to be revisited and t be rescheduled by bringing in the features of Vedic Systems. Vedic Systems do` not stop at complex numbers
55. Vedic Systems transcend further and workout transcendental domains (5-Space domain) of hyper cube- 5 format, self referral (6-Space domain) of hyper cube- 5 format
56. One may further have a pause here and take note that the $2 + 2 = 2 \times 2 = (-2) \times (-2)$.
57. Further as that 4×4 $(2^2 \times 2^2) = 4^2 = 2^4$ $(2^2)^2$
58. Still further $6 = 1 + 2 + 3 = 1 \times 2 \times 3 = 2 \times 3 = (-2) \times (-3) = (-1) \times (-1) \times (-2) \times (-3)$
59. With it, 4-Space as spatial dimensional space (2-Space playing the role of dimension of 4-space shall be having distinctive values for its Mathematics, Science and technology.
60. With it unless and until the present day schooling Mathematics conceptual format is not augmented for its transition and transformation on from line order 3-Space spatial order set up to 4-Space set up, we cannot expect present day Mathematics students to come out of their existing linear order mental states to comprehend values of Vedic Systems which are of spatial order format
61. Therefore we have to educate and teach Mathematics along a proper conceptual format so that there does note emerge Mathematical notes for the mental states

for the pass outs of school Mathematics as is being focus and restricted at present.

Dr. S. K. Kapoor, *Ved Ratan*　　■