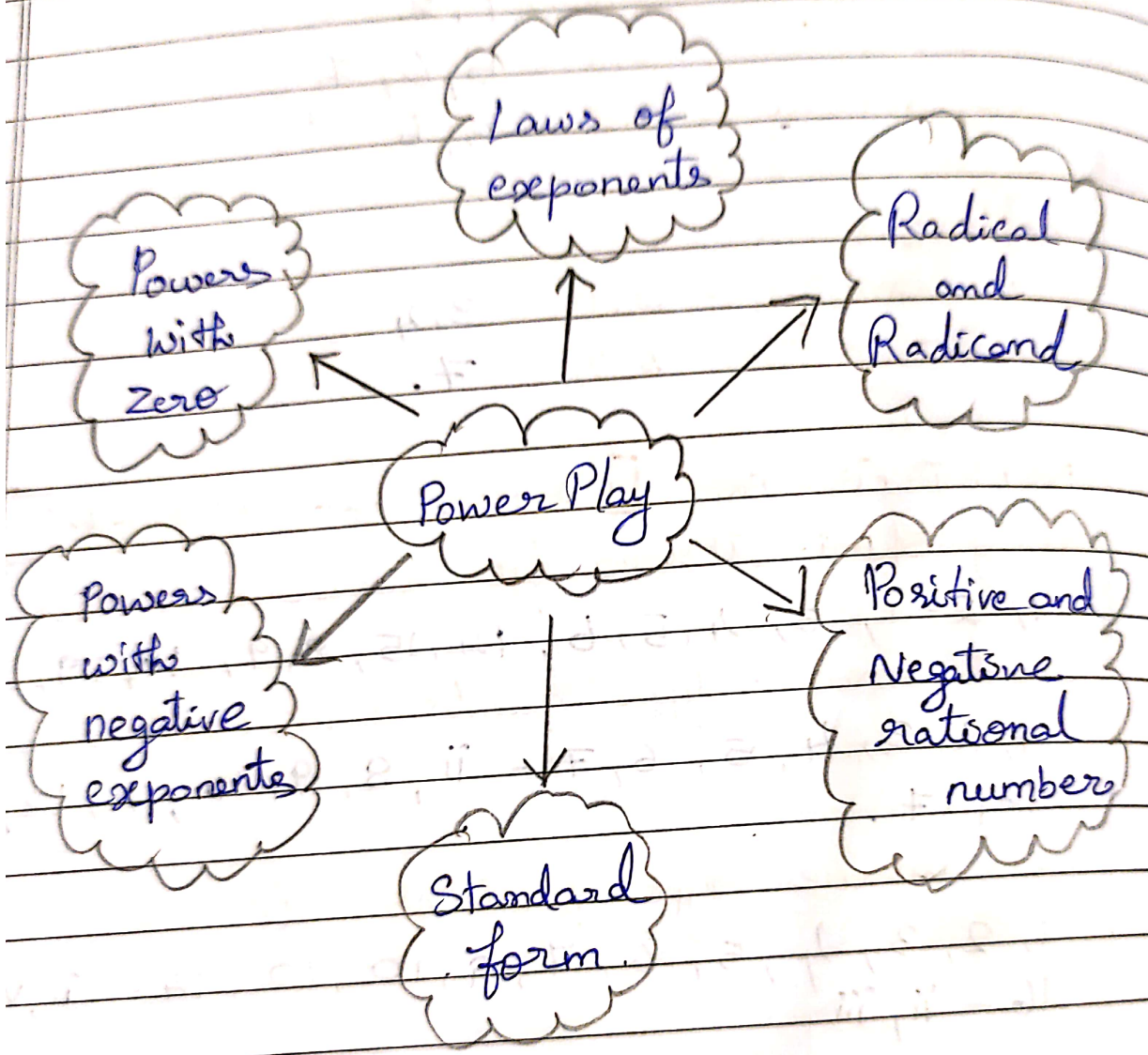


Chap. 2. Power Play

* Mindmap:



* If x and n are any natural numbers, then we have $x^n = x \times x \times x \dots n \text{ times}$.

The number ' x ' is called the base and ' n ' is called the exponent (or) the index of the exponential expression, x^n .

* Laws of exponents:

1. $a^m \times a^n = a^{m+n}$

$$\left(\frac{a}{b}\right)^m \times \left(\frac{a}{b}\right)^n = \left(\frac{a}{b}\right)^{m+n}$$

2. $(a^m)^n = a^{mn}$

$$\left[\left(\frac{a}{b}\right)^m\right]^n = \left(\frac{a}{b}\right)^{mn}$$

3. $a^m \times b^m = (ab)^m$

$$\left(\frac{a}{b}\right)^m \times \left(\frac{c}{d}\right)^m = \left(\frac{a \times c}{b \times d}\right)^m$$

4. $\frac{a^m}{a^n} = \begin{cases} a^{m-n} & \text{if } m > n \\ \frac{1}{a^{n-m}} & \text{if } n > m \end{cases}$

5. $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$

6. $a^0 = 1$

$$\left(\frac{a}{b}\right)^0 = 1$$

7. $a^{-n} = \frac{1}{a^n}$

* Rational Number:

A number is in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$ is called a rational number.

* Positive Rational Numbers:

$$x^{\frac{m}{n}} = (x^m)^{\frac{1}{n}}$$

* Negative Rational Numbers:

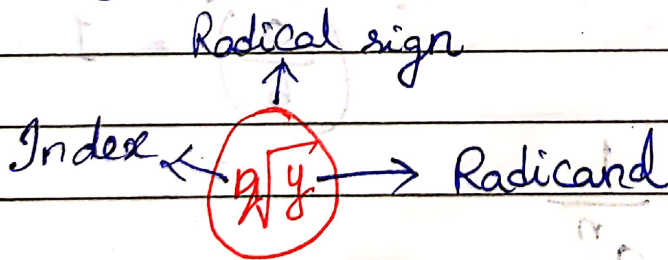
$$x^{-\frac{m}{n}} = \frac{1}{x^{\frac{m}{n}}}$$

* Radical and Radicand:

If $y \geq 0$ and $x = y^{\frac{1}{n}}$; then we can write it as $x = \sqrt[n]{y}$.

- Here $\sqrt[n]{y}$ is called radical form of $y^{\frac{1}{n}}$
- n is called index of the radical.
- y is called the radicand.

Note: Index of a radical is always positive



* Note:

1. $\sqrt[n]{a^n} = a$

2. $\sqrt[n]{ab} = \sqrt[n]{a} \sqrt[n]{b}$

$$3. \frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$$

$$4. \sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a}$$

$$5. \sqrt[n]{a^{-m}} = a^{-\frac{m}{n}}$$

Scientific Notation:

Scientific Notation is a way to write ^{very} large numbers (or) very small numbers as a product of a number between 1 and 10 and a power of 10.

Example: 1) $3,560,000 = 3.56 \times 10^6$
 2) $0.0000465 = 4.65 \times 10^{-5}$

NCERT FOLDER :

VSA [Pg no. 2.16] - 1-a, 2-a, 3, 4, 5, 6, 7, 8-a, d, e, 9, 10

SA [P.g no. 2.17] - 1, 2, 4, 5, 6, 7, 9, 10

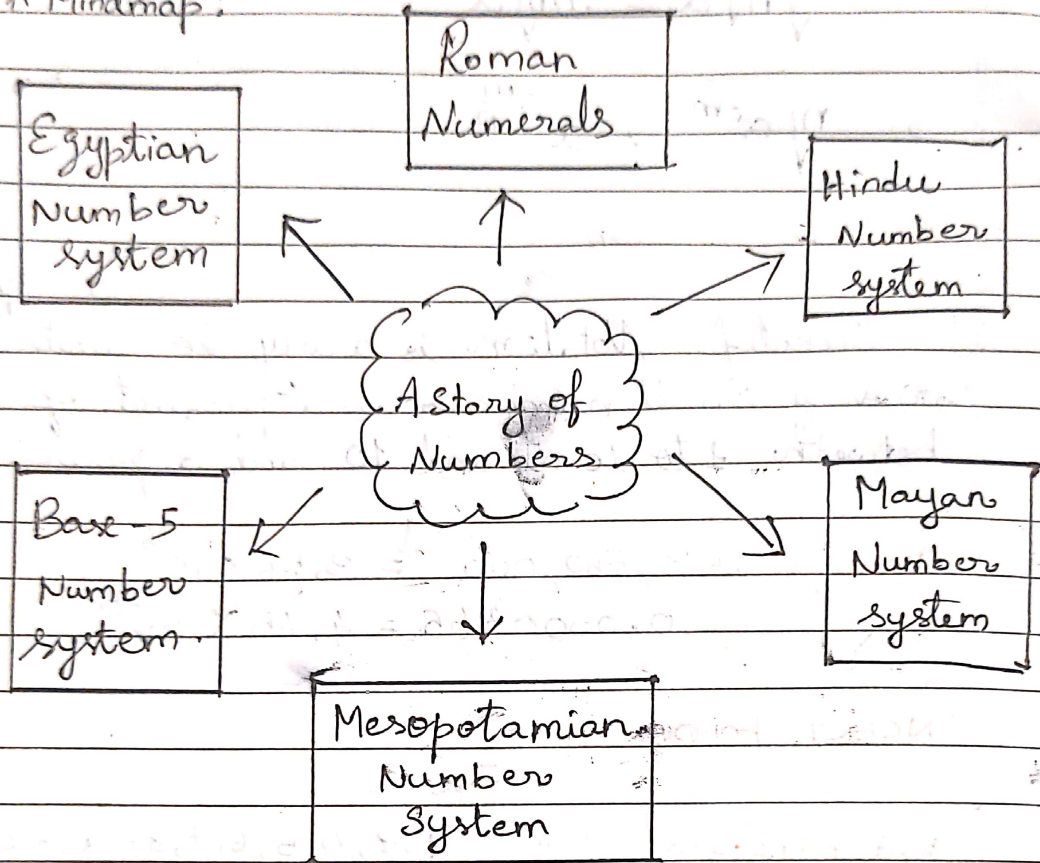
LA [P.g no. 2.17] - 1, 2-c, 3, 4-a, 5, 6-i, iv, 7-i, 8-i

P.g.no: 2.13 to 2.16 - Learners, Performers, Achievers class activities & home activities

P.g.no: 2.18, 2.19, 2.20 - Assertion & Reason, case based questions can be completed in text book

Chapter 3. A Story of Numbers

* Mindmap:



* To represent numbers, we need a standard sequence of objects, names or written symbols that have a fixed order. This standard sequence is called a number system.

* The modern Hindu (Indian) Number system is now used all over the world.

* Evolution of Numbers:

The development of number systems

happened in the following stages.

- counting using objects like sticks
- using number names
- using written symbols
- Using base systems and place value.
- Introduction of zero.

* Devanagari Numerals.

Number	0	1	2	3	4	5	6	7	8	9
Devanagari	०	१	२	३	४	५	६	७	८	९

* Binary System	0	1	10	11	100	101	110	111	1000	1001
Decimal System	0	1	2	3	4	5	6	7	8	9

* Mayan Numbers.

- Around 400 CE, the Mayans developed a base-20 (vigesimal) number system.
- This system has 3 main symbols.
 - 1 - • (dot)
 - 5 - ■ (Bar)
 - 0 - (III) (Shell symbol)
- Their system was almost used for calculations easier, calendar and astronomical calculations.

* Babylonian Numbers:

- Babylonians used a Base-60 system, also called Sexagesimal system.
- They used only 2 symbols

Number	1	10	60	600
Symbol				

* Egyptian Number system:

- Egyptian Hieroglyphic numerals uses symbols for powers of 10, relying on repetition for other numbers.

Number	Hieroglyph
1-9	
10	
100	
1000	 Lotus
10,000	
100,000	 Frog (sometimes a bird)
1,000,000	 "I am Freaking Rich"

* Roman Numerals:

Roman	I	V	X	L	C	D	M
Hindu Arabic	1	5	10	50	100	500	1000

1. Introduction

2. Objectives

3. Methodology

4. Results

5. Conclusion

6. References

7. Appendix

8. Acknowledgements

9. Bibliography

10. Appendix

11. Acknowledgements

12. Bibliography

13. Appendix

14. Acknowledgements

15. Bibliography

16. Appendix

17. Acknowledgements

18. Bibliography

19. Appendix

20. Acknowledgements

21. Bibliography

22. Appendix

23. Acknowledgements

24. Bibliography

25. Appendix

26. Acknowledgements

27. Bibliography

28. Appendix

29. Acknowledgements

30. Bibliography

31. Appendix

32. Acknowledgements

33. Bibliography

34. Appendix

35. Acknowledgements

36. Bibliography

37. Appendix

38. Acknowledgements

39. Bibliography

40. Appendix

41. Acknowledgements

42. Bibliography

43. Appendix

44. Acknowledgements

45. Bibliography

46. Appendix

47. Acknowledgements

48. Bibliography

49. Appendix

50. Acknowledgements

51. Bibliography

52. Appendix

53. Acknowledgements

54. Bibliography

55. Appendix

56. Acknowledgements

57. Bibliography

58. Appendix

59. Acknowledgements

60. Bibliography

61. Appendix

62. Acknowledgements

63. Bibliography

64. Appendix

65. Acknowledgements

66. Bibliography

67. Appendix

68. Acknowledgements

69. Bibliography

70. Appendix

71. Acknowledgements

72. Bibliography

73. Appendix

74. Acknowledgements

75. Bibliography

76. Appendix

77. Acknowledgements

78. Bibliography

79. Appendix

80. Acknowledgements

81. Bibliography

82. Appendix

83. Acknowledgements

84. Bibliography

85. Appendix

86. Acknowledgements

87. Bibliography

88. Appendix

89. Acknowledgements

90. Bibliography

91. Appendix

92. Acknowledgements

93. Bibliography

94. Appendix

95. Acknowledgements

96. Bibliography

97. Appendix

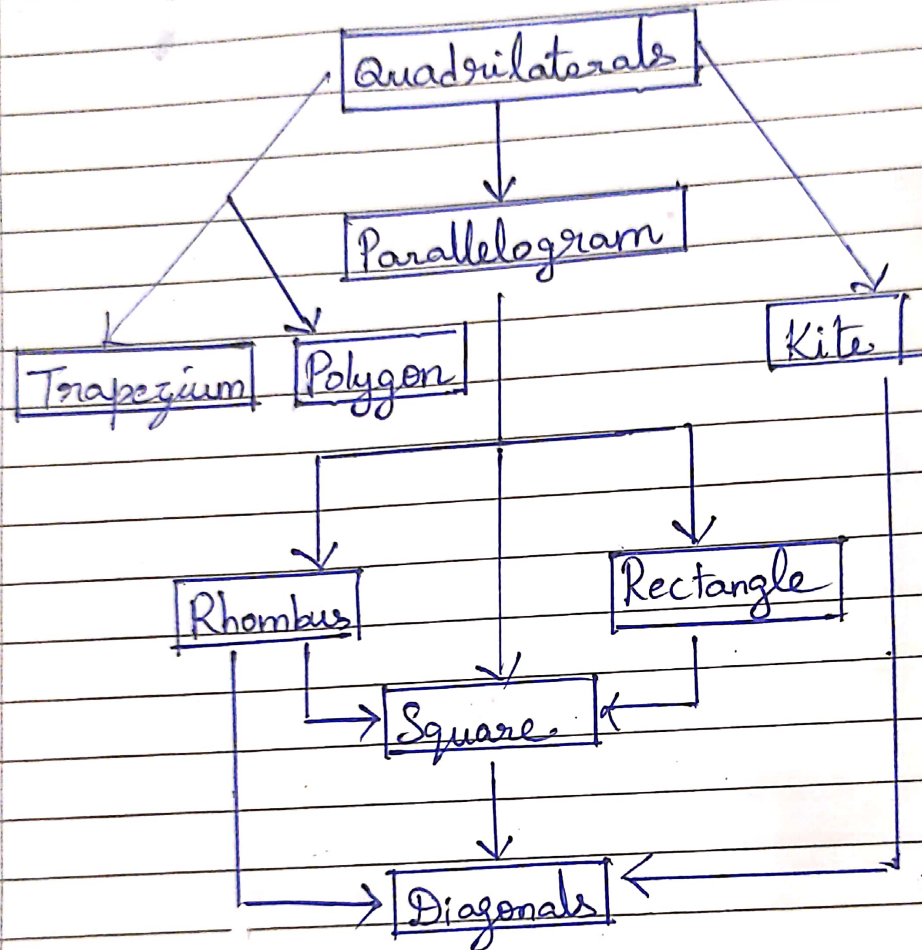
98. Acknowledgements

99. Bibliography

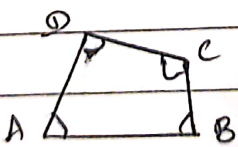
100. Appendix

chapter 4. Quadrilaterals

* Mindmap:



Quadrilaterals:



Vertices - A, B, C, D
 Sides - AB, BC, CD, DA
 Angles - $\angle ABC$, $\angle BCA$, $\angle CAB$, $\angle DAB$

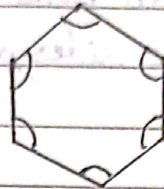
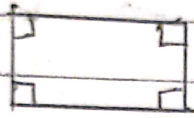
A simple closed figure bounded by four line segments is called quadrilateral.

Polygon:

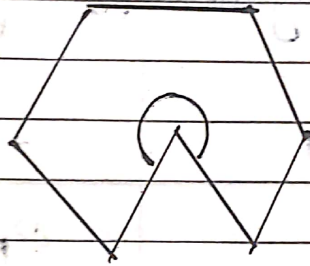
A simple closed curve made up of only line segments is called a polygon.

Types of polygon:

1) Convex polygon - A polygon in which each interior angle is less than 180° is called convex polygon.



2) Concave polygon - A polygon with at least one of the angle is more than 180° is called concave polygon.



Diagonal - A diagonal is a line segment joining two non-consecutive vertices of a polygon.

* Number of diagonals in a polygon of 'n' sides $\left. \vphantom{\begin{matrix} * \\ \end{matrix}} \right\} = \frac{n(n-3)}{2}$

* The sum of all the interior angles of a polygon of 'n' sides $\left. \vphantom{\begin{matrix} * \\ \end{matrix}} \right\} = \begin{matrix} (n-2) \times 180^\circ \text{ (or)} \\ (2n-4) \times 90^\circ \end{matrix}$

* Each exterior angle of a regular polygon $= \left(\frac{360}{n} \right)^\circ$

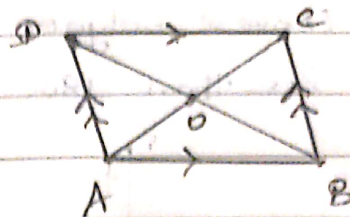
* Each interior angle of a regular polygon $= \left(\frac{2n-4}{n} \times 90^\circ \right)^\circ$

* Types of quadrilaterals

Diagram

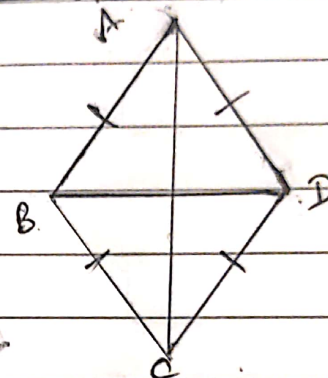
1. Parallelogram:

A parallelogram is a quadrilateral with both pairs of opposite sides are parallel.



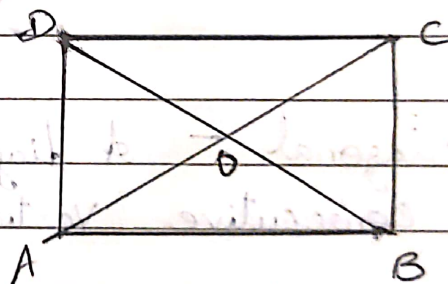
2. Rhombus:

A Rhombus is a parallelogram having all sides equal.



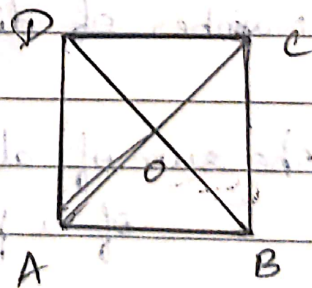
3. Rectangle:

A rectangle is a parallelogram each one of whose angle measures 90° .



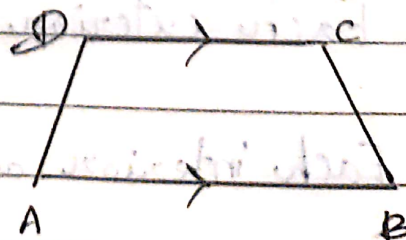
4. Square:

A square is a parallelogram having all sides equal and each angle measuring 90° .



5. Trapezium:

A quadrilateral having one pair of opposite sides are parallel.



Properties

- * opposite sides are equal and parallel.
- * opposite angles are equal.
- * The sum of the measures of all its angles is 360°
- * Adjacent angles are supplementary.
- * Diagonals bisect each other.
- * Each diagonal of a parallelogram divides it into 2 congruent triangles.

- * All sides are equal
- * Opposite sides are parallel.
- * Diagonals bisect each other at right angles

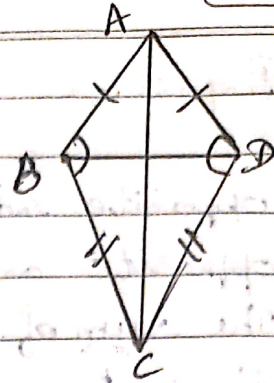
- * opposite sides are equal and parallel.
- * Diagonals are equal.
- * Diagonals bisect each other.
- * Each of its angle measures 90° .

- * opposite sides are parallel.
- * All sides are equal.
- * Each angle measures 90° .
- * Diagonals are equal and bisect each other at right angle

- * Adjacent angles between the parallel sides are supplementary.
- * A trapezium in which non parallel sides are equal is called isosceles trapezium.

Kite

A quadrilateral having two pairs of equal adjacent sides but opposite sides are unequal.



* Angle sum property of a quadrilateral:

The sum of all four angles in a quadrilateral is 360° .

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

* The sum of all exterior angles of a quadrilateral is 360° .

- * One pair of opposite angles are equal. $\angle B = \angle D$
- * The diagonal intersect each other at right angles.