Achievement Test in Mathematics (Post Test)
Question Papers for IX Std

Time: 1$\frac{1}{2}$ Hours
Max Marks: 100

Instructions: Observe each question carefully and tick the correct answer and fill up the answer in the unfilled column.

1. Square of 15 is
   1. 215
   2. 225
   3. 235
   4. 245

2. $\sqrt{81} + \sqrt{121} =$
   1. 10
   2. 20
   3. 30
   4. 40

3. Square root of 0.000081 is
   1. 0.009
   2. 0.0900
   3. 0.09
   4. 0.9

4. The statement which is based on commutative property is
   1. $a+b=b+a$
   2. $aXb = aXb$
   3. $a+b=a+b$
   4. $aXb = ab$

5. State the basic property on which the statement 6 (3+5) = 6X3 + 6X5 is based
   1. Distributive Property
   2. Associative Property
   3. Commutative Property
   4. Inverse Property

6. The index form of $7\sqrt{5}$ is
   1. $7(5)^{1/2}$
   2. $5(7)^{1/2}$
   3. $7(2)^{1/5}$
   4. $5(2)^{1/7}$
7. \( \sqrt{2}, \sqrt{3}, \sqrt{5}, \) are examples of______ numbers
   1. Rational
   2. Irrational
   3. Positive
   4. Negative

8. In a surd, the number which is written under the root sign is called______
   1. Order
   2. Index Form
   3. Square root
   4. Fraction

9. According to the Pythagoras Theorem______
   1. The square on the hypotenuse is equal to the sum of the squares on the
      other two sides of a right angle triangle
   2. The square on the hypotenuse is less than the sum of the squares on the
      other two sides of a right angle triangle
   3. The square on the hypotenuse is higher than the sum of the squares on
      the other sides of a right angle triangle
   4. The square on the hypotenuse is double than the sum of the squares on
      the other two sides of a right angle triangle

10. If \( P = \{10, 15, 20, 25\} \) and \( Q = \{10, 20, 30, 40\} \) then, \( P \cup Q \) is______
    1. \{10, 15, 20, 25\}
    2. \{10, 20, 30, 40\}
    3. \{10, 15, 20, 25, 30, 40\}
    4. \{30, 40\}

11. If \( P = \{2, 4, 6, 8\} \) and \( Q = \{10, 20, 30, 40\} \) then, \( P \cap Q = \)______
    1. \{2, 4, 6, 8\}
    2. \{10, 20, 30, 40\}
    3. \{\}\ (= \emptyset)
    4. \{2, 4, 10, 20\}

12. Let \( U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, \ A = \{1, 2, 3, 4\} \) and \( B = \{4, 5, 6\} \)
    Then, \( A^1 \cup B^1 = \)______
    1. \{1, 2, 3, 5, 6, 7, 8, 9, 10\}
    2. \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}
    3. \{1, 2, 3, 4\}
    4. \{4, 5, 6\}

13. \( A = \{1, 4, 9, 16, 25\} \) and \( B = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \) then, \( A - B = \)
    1. \{16, 25\}
    2. \{2, 3, 5, 6, 7, 8, 10\}
    3. \{1, 4, 9, 16, 25\}
    4. \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}

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14. A matrix is
1. Rectangular arrangement of numbers in rows and columns enclosed within brackets
2. Triangular arrangement of numbers in rows and columns enclosed within brackets
3. Circular arrangement of numbers in rows and columns enclosed within brackets
4. Conic arrangement of numbers in rows and columns enclosed within brackets

15. In a college 600 students study mathematics and 500 students study physics. If 300 students study both the subjects, Find the number of Students enrolled in these two subjects
1. 600
2. 800
3. 200
4. 300

16. In a matrix \( B = \begin{pmatrix} 1 & 5 & 6 \\ 2 & 8 & 9 \\ 3 & 4 & 6 \end{pmatrix} \) the elements 1, 8, 6 are called
1. Secondary diagonal elements
2. Primary diagonal elements
3. Principal diagonal elements
4. Symmetric elements

17. In Scalar matrix the Principal diagonal elements are
1. Different
2. Zero
3. One
4. Equal

18. The transpose of the matrix \( A = \begin{pmatrix} a & b & c \\ d & e & f \end{pmatrix} \) is
1. \( A^T = \begin{pmatrix} a & b \\ d & e \\ c & f \end{pmatrix} \)
2. \( A^T = \begin{pmatrix} a & e \\ d & f \\ b & c \end{pmatrix} \)
3. \( A^T = \begin{pmatrix} a & b & c \\ d & e & f \end{pmatrix} \)
4. \( A^T = \begin{pmatrix} a & e \\ b & c \\ c & f \end{pmatrix} \)
19. Name the matrix if \( A = \)
   
   1. Square Matrix  
   2. Diagonal Matrix  
   3. Symmetric Matrix  
   4. Rectangular Matrix 

20. If \( AXB = \square \) then either A is an empty set or B is an Empty set
   
   1. \( \emptyset \)  
   2. \( \in \)  
   3. \( \cup \)  
   4. \( \cap \) 

21. The money deposited in a bank is ________ is secure 

22. The interest in the bank will be calculated from ________ to ________ month.

23. Simple interest is calculated using the formula ________

24. ________ are the persons who deals with the purchase or sale of shares 

25. The cost of 200 at Rs.10 per share is _____________________

26. The price for which a commodity is available by payment of cash is called ____________________

27. In any Proportion the product of the means is equal to the product of the ________

28. The last term of the proportional is called the ________ Proportional 

29. When the angles of a triangle are written and the ratio of 2 : 3: 5 is ________ and 90°

30. The stock exchange in Bangalore is called ________________

31. In simple partnership the profit or loss is divided in the ratio of ______

32. The average increase or decrease in stocks and shares is indicated by ______

33. The two types of partnership is simple partnership and ____ partnership 

34. The service charge paid to the broker is called the ________

35. The tax imposed by the central Govt. on the income earned by individuals or a company is called __________________
36. A, B, C invest Rs. 12000, Rs. 15000 and Rs. 18000 respectively and A works as a working partner and sets 10% Profit more if the profit is Rs. 16000 then the Profit share of A = ________ Rs, B = _______ Rs, and C = _______ Rs.

37. The price agreed between goods seller and buyer is known as ________

38. The arithmetic mean of 15, 21, 40, 30, 31, 17, 18, 16 is ______

39. The scatter or variability in a set of data is called _________

40. Highest score - Lowest score = ______________________

41. The average of the two middle scores is the ________

42. The mean deviation of 10, 20, 23, 12, 16, 19, 22, 13, 27 is ________

43. Charles Babbage is considered as ______ of computers

44. The charts of good visual nods for presenting algorithms is called ________

45. The resulting answer is put out by the computer is called ______

46. While developing a flow chart to find the area of a rectangle is ______

47. Factorisation of PQ + QR + Pr + P² = ________________
   1. Q(P+Q) + P(r + P)
   2. P(Q + QR) + r(P + r)
   3. Q(P+R) + P(r + P)
   4. P(r + Q) + P(r + P)

48. Factorisation of 4X² + 12X + 9 = ________________
   1. (2x + 3)²
   2. (2x + 3)³
   3. (2x+3)
   4. (2x-3)²

49. Factorisation of 3x² - 27y² using the identity a²-b² = (a + b)(a-b)
   1. (3x + 9y)(x + 3y)
   2. 3{(x + 3y)(x + 3y)}
   3. 3{(x + 3y)(x-3y)}
   4. 3{(x-3y)(x-3y)}

50. The HCF of 5a², 10a³, 15ap is = ____________
   1. 5a
   2. 10ap
   3. 5a²p
   4. 10a³p
51. The HCF of $x(a-x)^2, a(a-x)^3$ =
1. $(a-x)$
2. $(a-x)^2$
3. $(a-x)^3$
4. $(a-x)^4$

52. The LCM of $5x^2y^2, 10y^2z^2, 15x^2z^2$ =
1. $5x^2y^2$
2. $30x^2y^2z^2$
3. $10x^2y^2z^2$
4. $15x^2y^2z^2$

53. The LCM of $a^3$ & $(a^2-2a)$ =
1. $a^3(a-2)$
2. $a(a^3-2)$
3. $a^2(a-2)$
4. $a(a^2-2)$

54. Divide $4x^3 - 19x^2 + 24x$ by $4x - 3$, we get
1. $x^2 + 4x - 3$
2. $x^2 - 4x + 3$
3. $x^2 + 3x + 4$
4. $x^2 - 3x - 4$

55. Simplify: $\frac{5x^2y \cdot 7xy^2 \cdot 8x^3y^2}{35x^3y^5}$ =
1. $8x^3y^3$
2. $8x^2y^2$
3. $8xy$
4. $8xy^3$

56. If $f(x) = 2x + 3$, then $f(1)$ =
1. 4
2. 3
3. 5
4. 6

57. The remainder when $x^2 - 3x + 4$ is divided by $x - 3$ is =
1. 2
2. 5
3. 3
4. 4

58. In the Equations $x + y = 7, x - y = 3$, Then the values of $x$ and $y$ are __
1. $x = 5, y = 2$
2. $x = 2, y = 5$
3. $x = 2, y = 5$
4. $x = 3, y = 7$
59. \(x+2y=7; \ x-2y=1\) than the values of \(x=\) ______ and \(y=\) ______
   1. \(x=2, \ y=3\)
   2. \(x=4, \ y=3/2\)
   3. \(x=3/2, \ y=4\)
   4. \(x=2, \ y=2/3\)

60. The price of 2 kg tea leaves and 5 kg sugar is Rs.325 and price of 3 kg tea leaves and 8 kg sugar is Rs.495, then the price of 4 kg tea leaves and 15 kg sugar is ______
   1. Rs.500 and Rs.225
   2. Rs.125 and Rs.225
   3. Rs.400 and Rs.225
   4. Rs.500 and Rs.205

61. The sum of two numbers is 97 and their difference is 51. The numbers are ______
   1. 74 & 23
   2. 73 & 24
   3. 97 & 51
   4. 138 & 97

62. In the Simultaneous Equations \(2x - y = 3\) and \(x + 2y = 14\) then the values of \(x\) and \(y\) are ______
   1. \(x = 3, \ y=14\)
   2. \(x = 4, \ y = 5\)
   3. \(x = 5, \ y = 4\)
   4. \(x=14, \ y = 3\)

63. Set of natural numbers = ____________

64. Meaning of the Symbol \(\forall\) = ____________

65. The sum of the four angles of a quadrilateral is ______
   1. 360°
   2. 180°
   3. 240°
   4. 380°

66. Two angles of a quadrilateral are 65° each the other two angles are equal. Find the measure of other two equal angles ______
   1. 110° each
   2. 115° each
   3. 120° each
   4. 125° each
67. A quadrilateral has an area 300\text{SQcm} & the length of the diagonal is 50cm. Then the length of its corresponding altitude if they are equal is ______
   1. 3 cms
   2. 6 cms
   3. 9 cms
   4. 12 cms

68. Three angles of a quadrilateral are equal—the fourth angle is 150°. What is the measure of equal angles ______
   1. 70°
   2. 60°
   3. 75°
   4. 80°

69. The name of the quadrilateral where all the sides are equal is called a ______
   1. Rectangle
   2. Trapezium
   3. Square
   4. Parallelogram

70. In a Rhombus ABCD, identify the sides, angles and diagonals
   Sides ______
   Angles ______
   Diagonals ______

71. The ______ in a Rhombus divide into two congruent triangles
   1. Diagonals
   2. Sides
   3. Angles
   4. Vertices

72. In a Rhombus, the diagonals are ______ bisect each other
   1. Vertically
   2. Equally
   3. Mutually
   4. Horizontally

73. The opposite angles in a Rhombus are ______
   1. Equal
   2. Unequal
   3. Supplementary
   4. Complementary
74. The area of a parallelogram is
   1. Base x height
   2. 1/2 X base x height
   3. 1/2 X diagonal x heights (altitudes)
   4. 1/2 X 2 sides x height

75. The parallel sides of a trapezium are 18cms & 17cms & then the measurement of its height is
   1. 8 cms
   2. 16 cms
   3. 20 cms
   4. 14 cms

76. Area of a quadrilateral is 140 sq cm the attitudes on the diagonal are 6 cm and 8 cm. Find the corresponding diagonal
   1. 20cms
   2. 14cms
   3. 7cms
   4. 10cms

77. In a parallelogram, if one angle is a________, then it is a rectangle
   1. Obtuse angle
   2. Right angle
   3. Equal angle
   4. Acute angle

78. The attitude to the base of a parallelogram is 4 cms and whose base is 10 cms, than the area of the parallelogram is
   1. 40
   2. 30
   3. 10
   4. 20

79. In a parallelogram KLMN, given \( \hat{K} = 60^0 \) calculate the remaining angles
   1. \( \hat{K} = 60^0 \)
   2. \( \hat{N} = \)
   3. \( \hat{M} = \)
   4. \( \hat{L} = \)

80. If a triangle & a parallelogram stand on the same base & b/w the same parallels, the area of the triangle is equal to
   1. Half
   2. Two
   3. Three
   4. Four
81. "A parallelogram & rectangle on the same base & with in the same parallels are equal in area" - this theorem was proved by
1. Baudhyana
2. Aswalayana
3. Bhaskara
4. Mahaveera

82. The figure obtained by joining the mid points of the adjacent sides of a quadrilateral is a _____
1. Trapezium
2. Parallelogram
3. Square
4. Common quadrilateral

83. The formula Used to calculate the Area of a Square is ___________
1. \( A = a^2 \)
2. \( A = a^3 \)
3. \( A = a^4 \)
4. \( A = a^2 b^2 \)

84. In a rectangle adjacent sides are __________
1. Equal
2. Un Equal
3. Vertical
4. Horizontal

85. The line segment joining the center to any point on the circle is called __________
1. Radius
2. Chord
3. Arc
4. Region

86. The angles in the same segment are __________
1. More
2. Less
3. Unequal
4. Equal

87. A Quadrilateral, whose vertices lie on the circle is called a ____________
1. Parallel
2. Cyclic
3. In centric
4. Square
88. The octagon has _________ sides
   1. 8
   2. 9
   3. 6
   4. 5

89. Hexagon forms ________ triangles
   1. 3
   2. 4
   3. 5
   4. 6

90. The number of sides in a Nonagon is _____
   1. 9
   2. 10
   3. 8
   4. 7

91. Circle also a ________ polygon
   1. Curved
   2. Regular
   3. Irregular
   4. Empty

92. Which one of the following figure is a polygon?

   Fig 1.  Fig 2.  Fig 3.

   1. 1
   2. 2
   3. 3
   4. None

93. What is the shape of the wheels of charts, automobiles and trains ________
   1. Circular Shape
   2. Rectangular Shape
   3. Hallow Shape
   4. Square Shape

94. The dimensions of a solid figure is ________
   1. Length X breadth
   2. Length X breadth X height
   3. Breadth X height
   4. Length X height
95. The total surface area of a square based pyramid whose length of the base is 5 Cms and slant height is 8 Cms =
   1. 55 Sq Cms
   2. 105 Sq Cms
   3. 100 Sq Cms
   4. 150 Sq Cms

96. The minimum points required for a plane figure is ______
   1. 4
   2. 2
   3. 3
   4. 5

97. The lateral surface area of a prism ____________
   1. 1/2 X (base)^2 X height
   2. 1/2 X base X (height)^2
   3. 1/2 X base X height
   4. Perimeter of the base X height

98. The lateral faces of a rectangular cube is ________
   1. 6
   2. 5
   3. 4
   4. 8

99. The volume of a triangular based right prism whose base is an equilateral triangle with side 6 cms and height is 10 cms =
   1. 90 \sqrt{3} C.cms
   2. 3\sqrt{90} C.cms
   3. \sqrt{90} C.cms
   4. 3 \sqrt{3} C.cms

100. The height of the square based pyramid whose side of the base is 15 Cms and the volume is 900 C. Cms =
    1. 15 Cms
    2. 12 Cms
    3. 9 Cms
    4. 21 Cms
Note:- Students should give the following Information

<table>
<thead>
<tr>
<th>Category</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Name</td>
<td></td>
</tr>
<tr>
<td>Student Name</td>
<td></td>
</tr>
<tr>
<td>Class &amp; Section</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td></td>
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<tr>
<td>Age</td>
<td></td>
</tr>
</tbody>
</table>
Achievement Test in Mathematics (Post Test)

ANSWER KEY

Time : 1 1/2 Hours

Max Marks : 100

1. 225
2. 20
3. 0.009
4. \( a+b = b+a \)
5. Distributive Property
6. \( 7(5)1/2 \)
7. Irrational
8. Distributive Property
9. The square on the hypotenuse is equal to the sum of the squares on the other two sides of a right triangle.
10. \{10,15,20,25,30,40\}
11. \{ \} = \phi
12. \{1,2,3,4,5,6,7,8,9,10\}
13. \{16, 25\}
14. Rectangular arrangement of numbers in rows and columns enclosed with in brackets
15. 800
16. Principal diagonal elements
17. Equal
\[
\begin{bmatrix}
a & d \\
b & e \\
c & f \\
\end{bmatrix}
\]
18. \( PT \)
19. Diagonal Matrix
20. Safe
21. January, June
22. January, June

PTR
23. SI = 100
24. Brokers
25. Rs. 2000
26. Cash Price
27. Extremes
28. Mean
29. 36°, 54°
30. The Bangalore Stock Exchange Ltd.
31. Capitals
32. Sensex
33. Compound
34. Brokerage
35. Income Tax
36. Rs. 5440, Rs. 4800, Rs. 5760
37. Installment
38. 23.5
39. Dispersion
40. Range
41. Mean
42. 4.6
43. Father
44. Flow Charts
45. Output
46. Start → Read I.b. → Area; LXB → Print Area → Stop
47. Q(P+R) + P(r+p)
48. (2x+3)2
49. 3{(x+3y)(x-3y)}
50. 5a
51. (a-x)2
52. 30x2y2z2
53. a3(a-2)
54. x4 \cdot x+3
55. 8x3y3
56. 5
57. 4
58. x=5, y=2
59. x=4, y=3/2
60. Rs. 500 and Rs. 225

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61. 74 & 23
62. x=4, y=5
63. N= \{1,2,3,\ldots\}
64. For all
65. 360°
66. 115°
67. 6 cms
68. 70°
69. Square
70. Sides – AD, DC, BC & AB
   Angles – \(\hat{A} \hat{B} \hat{C} \hat{D}\)
   Diagonals – AC & BD
71. Diagonal
72. Vertically
73. Equal
74. Base X Height
75. 8 cms
76. 20 cms
77. Right angle
78. 40
79. \(K = 60°\); \(M = 60°\); \(L = 120°\); \(N = 120°\)
80. Half
81. Baudhyana
82. Parallelogram
83. A=a²
84. Equal
85. Radius
86. Equal
87. Cyclic
88. 8
89. 4
90. 9
91. Curved
92. Fig 3.
93. Circular Shape
94. Length X Breadth x Height
95. 105 sq cms
96. 3
97. Perimeter of the base X Height
98. 6
99. $90\sqrt{3}$ C.cms
100. 12 cms
LESSON PLAN FOR CONVENTIONAL INSTRUCTION - 1

SUBJECT:- MATHEMATICS ( ARITHMETIC )

NAME OF THE SCHOOL :- G.H.S, CRP

CLASS : - IX Std “A”

UNIT : NUMBER SYSTEM

TOPIC : NATURAL NUMBERS

Major Concepts :-

1. Set of natural numbers
2. Properties of natural numbers

Instructional Objectives :-

Pupils will be able to
1. Recall the different sets of natural numbers [ K ]
2. Recognise the different sets of natural numbers [K ]
3. Understand how to write the different sets of natural numbers [ U ]
4. Give examples for different sets of natural numbers [U ]
5. Recognise the properties of natural numbers [U ]
6. Explain the properties of natural numbers with examples [U ]
My dear students,
You have studied various concepts in your previous class in mathematics.

Then tell me,

1. Which are three parts of mathematics?
2. Name some basic fundamental operations used in mathematics.
3. In your previous class what you have learnt in arithmetic?

Then teacher asks the students
4. What are counting numbers?
5. What are these numbers called as?

Now teacher puts a question, 6.
What are natural numbers?

<table>
<thead>
<tr>
<th><strong>Expected previous knowledge</strong></th>
<th><strong>Introductory Activities.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students recall their previous knowledge &amp; answer to the following questions asked by the teacher.</td>
<td>My dear students, You have studied various concepts in your previous class in mathematics.</td>
</tr>
<tr>
<td>1. Arithmetic, Algebra, Geometry</td>
<td></td>
</tr>
<tr>
<td>2. Addition, Subtraction, Multiplication and Division</td>
<td>Then tell me,</td>
</tr>
<tr>
<td>3. Numbers, sets, integers, real numbers, rational &amp; irrational numbers, etc.</td>
<td>1. Which are three parts of mathematics?</td>
</tr>
<tr>
<td>4. 1, 2, 3, 4,...</td>
<td>2. Name some basic fundamental operations used in mathematics.</td>
</tr>
<tr>
<td>5. These are called as natural numbers</td>
<td>3. In your previous class what you have learnt in arithmetic?</td>
</tr>
<tr>
<td>6. Students show curiosity about the natural numbers.</td>
<td>4. What are counting numbers?</td>
</tr>
<tr>
<td></td>
<td>5. What are these numbers called as?</td>
</tr>
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<td></td>
<td>Now teacher puts a question, 6.</td>
</tr>
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<td></td>
<td>What are natural numbers?</td>
</tr>
</tbody>
</table>
Statement of aim: -

Today let us try to understand the set of natural numbers and properties of natural numbers.

Development of the lesson:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Content Analysis</th>
<th>Teaching approaches/\nLearning Experiences</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognize natural numbers [K]</td>
<td>Natural numbers/Counting numbers</td>
<td>Teachers show a chart showing numbers. Then what do you call these numbers as?</td>
<td>Tell another name for counting numbers</td>
</tr>
<tr>
<td></td>
<td>1,2,3,-------- In Mathematics, they are also known as Natural numbers.</td>
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<td></td>
<td>‘N’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explain the properties of natural numbers [U]</td>
<td>Properties of natural numbers; Closure property for addition: for any a, b \in N</td>
<td>Teacher asks the students. Do you know the properties of natural numbers? Teacher explains the properties of natural numbers with the help of the students.</td>
<td></td>
</tr>
</tbody>
</table>
1. Teacher gives examples for closure property
   \[ V \cup \{1, 2, 8\} \subseteq \mathbb{N} \]
   \[ V \cup \{2, 4\} \subseteq \mathbb{N} \]

2. Teacher gives examples for commutative property
   \[ 1 + 2 = 2 + 1 \]
   \[ 3 \cdot 2 = 2 \cdot 3 \]

3. Teacher gives examples for associative property
   \[ (1 + 2) + 3 = 1 + (2 + 3) \]
   \[ 2 \cdot (3 \cdot 4) = (2 \cdot 3) \cdot 4 \]

**Generalise the properties of natural numbers**

<table>
<thead>
<tr>
<th>Closure property</th>
<th>Commutative property</th>
<th>Associative property</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ \forall a, b \in \mathbb{N} ] [ a \cdot b = b \cdot a ]</td>
<td>Additivity: [ \forall a, b \in \mathbb{N} ] [ a + b = b + a ]</td>
<td>Additivity: [ \forall a, b, c \in \mathbb{N} ] [ (a + b) + c = a + (b + c) ]</td>
</tr>
<tr>
<td>[ \forall a, b \in \mathbb{N} ] [ a \cdot b = b \cdot a ]</td>
<td>Multiplicativity: [ \forall a, b \in \mathbb{N} ] [ a \cdot b = b \cdot a ]</td>
<td>Multiplicativity: [ \forall a, b, c \in \mathbb{N} ] [ (a \cdot b) \cdot c = a \cdot (b \cdot c) ]</td>
</tr>
</tbody>
</table>
Teacher solves a model sum on blackboard with the help of the students. Solve the problem using properties of natural numbers of the following:

1. $3 + 8 = 8 + 3$
2. Which is the property given by this problem?
3. Write the general formula for commutative property for addition & multiplication
4. What are $a$, $b$ in the given problem?

**Generalization:**

| Commutative property for addition | a + b = b + a  
| a x b = b x a  
| put $a=3$, $b=8$  
| 3 + 8 = 8 + 3  
| 11 = 11  
| 3 x 8 = 8 x 3  
| 24 = 24 |

| Commutative property for multiplication | $a x b = b x a$  
| 3 x 8 = 8 x 3  
| 24 = 24 |

**A] Model Sum:**

Problem Solving

1. Commutative property for addition.
2. $a + b = b + a$
3. put $a=3$, $b=8$
4. $3 + 8 = 8 + 3$

$a + b = b + a$

$b = a$  
$13 + 15 = 15 + 13$
$28 = 28$

**B] Drill Sum:** Substitute the values by using property with the help of model sum & answers –

Teacher helps the students Substitute the value of $a$ & $b$ in commutative property for addition & multiplication & simplify this.

Solve the problem using commutative property:

13, 15
<table>
<thead>
<tr>
<th>Recapitulatory Questions</th>
<th>Black Board Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are counting numbers?</td>
<td>1. 1, 2, 3, 4, ....... are called counting numbers.</td>
</tr>
<tr>
<td>2. Name the properties of natural numbers?</td>
<td>2. Closure property, commutative property, associative property</td>
</tr>
</tbody>
</table>

**Black Board Summary**

1. 1, 2, 3, 4, ........ are called counting numbers.
2. Closure property, commutative property, associative property

### i) a + b = b + a
1. \( a = 5, b = 12 \)
2. \( a = 9, b = 6, c = 7 \)
3. \( a = 2, b = 4, c = 6 \)

### ii) a x b = b x a
1. \( 13 + 15 = 15 + 13 \)
2. \( 28 = 28 \) (Application)
3. \( 13 \times 15 = 15 \times 13 \)
4. \( 195 = 195 \) (Application)

---

**By using this property solve:**

1. Teacher supervises this work
2. Teacher helps if necessary
3. Teacher asks the student to solve the problem on the B.B
4. Teacher exhibits the prepared chart if necessary
Home Work :-

1. State the basic property of natural number used in each of the following statements.
   a) \( 8 \times (2 \times 7) = (8 \times 2) \times 7 \)
   b) \( 9 + 8 = 8 + 9 \)

2. What are natural numbers?

Special activity :-

Verify the basic properties of natural numbers by taking some more examples.
### CHART No. 1

**NUMBER SYSTEM**

The Set of Counting numbers are called natural numbers and denoted by \( N \). Thus, \( N = \{1, 2, 3, 4, \ldots \} \)

The Set Containing all natural numbers and zero is the Set of whole numbers and denoted by \( W \). Thus \( W = \{0, 1, 2, 3, 4, \ldots \} \)

Zero — A Jewel contribution from Indian mind.

Mathematical activity is followed by Addition, Subtraction, Multiplication and Division. They are represented by +, −, × and ÷ respectively. Without these, no work will be continued.

### SOME IMPORTANT PROPERTIES OF NATURAL NUMBERS

1. **Closure property**: Sum or product of any two natural numbers is a natural number.

   **Rules**: 1) \( \forall a \in \mathbb{N}, b \in \mathbb{N} \), \( a + b = c \in \mathbb{N} \) (\( a + b \) belongs to \( \mathbb{N} \))
   
   2) \( a \times b = c \in \mathbb{N} \) (\( a \times b \) belongs to \( \mathbb{N} \))

   **Examples**: 1) \( 2, 3 \in \mathbb{N}, 5 \in \mathbb{N} \)

2. **Commutative property**: Rules:

   1) \( \forall a, b \in \mathbb{N} \) Ex: 1) \( 4, 6 \in \mathbb{N} \)
   
   2) \( a + b = b + a \)
   
   3) \( a \times b = b \times a \)

   2) \( 5 + 8 = 8 + 5 \)
   
   3) \( 5 \times 4 = 4 \times 5 \)

3. **Associative property**:

   **Rules**: \( \forall a, b, c \in \mathbb{N} \)

   1) \( a + (b + c) = (a + b) + c \) Ex: 1) \( 3, 5 \in \mathbb{N} \)

   2) \( a \times (b \times c) = (a \times b) \times c \)

   3) \( (5 \times 6) \times 7 = 5 \times (6 \times 7) \)