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NATURAL NUMBERS AND WHOLE NUMBERS

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 05
CHAPTER NAME : NATURAL NUMBERS AND WHOLE NUMBERS
SUB TOPIC: Patterns in Whole / Natural Numbers
P**PERIOD NO: 6**

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Learning outcomes

- Students will be able to solve questions involving patterns.

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Previous knowledge Test

1. Does there exist a number a such that a ÷ a = a?
Solution:
Yes and the number a is 1
a ÷ a = a
1 ÷ 1 = 1
51 ÷5 1 = 1

2. Divide 5936 by 43 to find the quotient and remainder. Also, check your division by using the formula, dividend = divisor × quotient + remainder

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Natural Numbers and Whole Numbers

1. For each pattern, given below, write the next three steps:

(i) $1 \times 9 + 1 = 10$

$12 \times 9 + 2 = 110$

$123 \times 9 + 3 = 1110$

(ii) $9 \times 9 + 7 = 88$

$98 \times 9 + 6 = 888$

$987 \times 9 + 5 = 8888$

(iii) $1 \times 8 + 1 = 9$

$12 \times 8 + 2 = 98$

$123 \times 8 + 3 = 987$

(iv) $111 \div 3 = 37$

$222 \div 6 = 37$

$333 \div 9 = 37$

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Solution:

(i) 1234 × 9 + 4 = 11110

12345 × 9 + 5 = 111110

123456 × 9 + 6 = 1111110

(ii) 9876 × 9 + 4 = 88888

98765 × 9 + 3 = 888888

987654 × 9 + 2 = 8888888

(iii)1234 × 8 + 4 = 9876

12345 × 8 + 5 = 98765

123456 × 8 + 6 = 987654

(iv)444 ÷ 12 = 37

555 ÷ 15 = 37

666 ÷ 18 = 37

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Evaluation Question

2. Complete each of the following magic squares:

(i)

6	7	.....
.....	5	9
8	.....	4

4	.....	8
.....	7	.....
.....	.....	10

16	2	.....
.....	10	.....
.....	.....	4

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Evaluation Question

(i) Sum for row-wise is as follows

6 + 7 + 2 = 15

1 + 5 + 9 = 15

8 + 3 + 4 = 15

Sum for column wise is as follows

6 + 1 + 8 = 15

7 + 5 + 3 = 15

2 + 9 + 4 = 15

Sum for diagonal wise is as follows

6 + 5 + 4 = 15

2 + 5 + 8 = 15

Hence, the magic square is

6	7	2
1	5	9
8	3	4

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Evaluation Question

Solution:

(ii) Row wise sum is as follows:

4 + 9 + 8 = 21

11 + 7 + 3 = 21

6 + 5 + 10 = 21

Column wise sum is as follows

4 + 11 + 6 = 21

9 + 7 + 5 = 21

8 + 3 + 10 = 21

Diagonal wise sum is as follows

4 + 7 + 10 = 21

8 + 7 + 6 = 21

Hence, the magic square is

4	9	8
11	7	3
6	5	10

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Evaluation Question

iii) Row wise sum is as follows
16 + 2 + 12 = 30
6 + 10 + 14 = 30
8 + 18 + 4 = 30
Column wise sum is as follows
16 + 6 + 8 = 30
2 + 10 + 18 = 30
12 + 14 + 4 = 30
Diagonal wise sum is as follows
16 + 10 + 4 = 30
12 + 10 + 8 = 30
Hence, the magic square is

16	2	12
6	10	14
8	18	4

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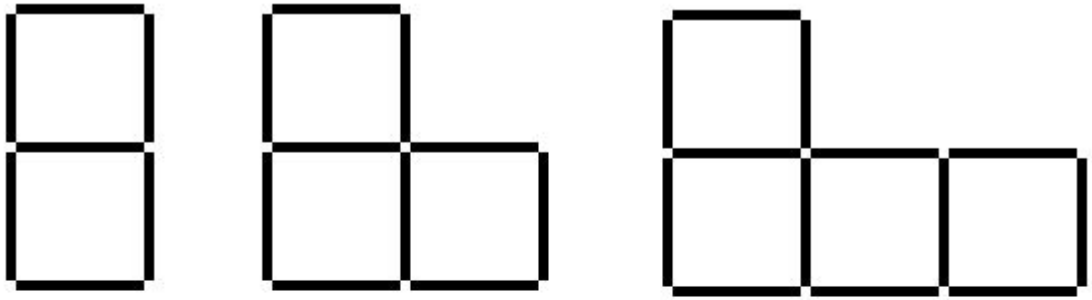
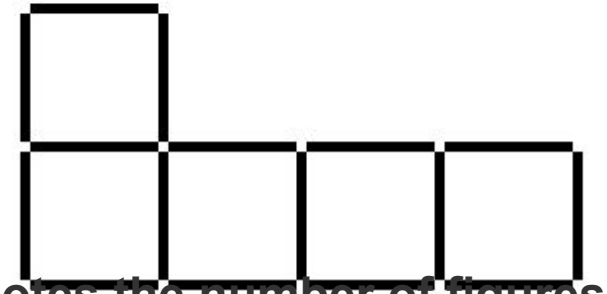
Evaluation Question

3. See the following pattern carefully:



and



(i) If n denotes the number of figures and S denotes the number of matchsticks;

(ii) find S in terms of n.

(ii) Find how many matches are required to make the:

Evaluation Question

(1) 15^{th} figure

(2) 40^{th} figure

(iii) Write a description of the pattern in words,

Solution:

The table is

N	1	2	3	4
S	7	10	13	16

S = 3n + 4

(ii) (1) 15^{th} figure has = 3 × 15 + 4

= 49 matches

(2) 40^{th} figure has = 3 × 40 + 4

= 124 matches

(iii) It is clear that each time the figure (n) is increased by 4, the number of matches (S) are increased by 3.

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Evaluation Question

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4. (i) In the following pattern, draw the next two figures.

(ii) Construct a table to describe the figures in the above pattern.
(iii) If n denotes the number of figures and L denotes the number of matchsticks, fin
(iv) Find how many matchsticks are required to make the:
(1) 12th figure

(2) 20th figure

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Evaluation Question

N	1	2	3	4	5
L	2	4	6	8	10

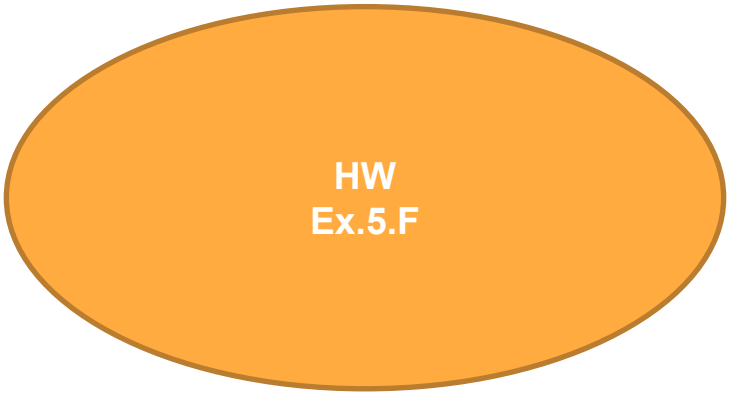
ii) The table is given above

(iii) Hence, the value of L is

L = 2n

(iv) (1) Number of matchsticks in 12^{th} figure = 2 × 12= 24

(2) Number of matchsticks in 20^{th} figure = 2 × 20= 40



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THANKING YOU

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