GREENHILL PRIMARY SCHOOL-BUWAATE

PRIMARY SIX MATHEMATICS NOTES 2020.

NAME : _____ STREAM:_____

Day 1 week 2

PATTERN AND SEQUENCE

NUMBER SYSTEMS

- Number systems are the different types of numbers we use.

<u>Examples</u>

1.Natural numbers

These are the same as counting numbers . The numbers are
{1,2,3,4,5,6,7,8,9,10,11,12,13,...}

The pattern of natural/counting numbers is 1 i.e. to get the next natural /counting number, you add 1.

e.g. If the 1st number is 4, then to get the next number will be 4+1 giving us 5

2. Whole numbers

These are numbers when divided by 2 leaves 0 as the remainder. The whole numbers include {0,1,2,3,4,5,6,7,8,9,10,11,12,- - -}

The pattern of whole numbers is 1.

Note: We keep on adding 1 to get other next /subsequent numbers in natural/counting numbers and whole numbers because the pattern in those numbers is 1.

3.Even numbers

These are whole numbers which are completely divisible by 2. Or Even numbers are numbers that can be divided by 2 and leaves no remainder.
Note: Even numbers end with digits 0,2,4,6, and 8.

How to obtain even numbers

When a whole number is multiplied by 2 or doubled you get an even number

Eg

0 x 2 = 0	2 x 2 = 4	4 x 2 = 8	6x2 = 12	8 x 2 =16
1 x 2 = 2	3 x 2 = 6	5 x 2 = 10	7x2 = 14	9 x 2 = 18

Order of even numbers = { 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, …}

Note: We keep on adding 2 to get other next /subsequent even numbers in because the pattern in even numbers is 2.

4.Odd numbers

These are whole numbers which are not completely divisible by 2. When you divide these numbers by 2, you get 1 as the remainder.

Note: Odd numbers end with digits 1,3,5,7, and 9.

The order of odd numbers is {1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21,23,25, …}

Point to remember:
Factors are the two numbers multiplied to get another number.
eg 2 and 3.

5.Prime numbers:

Prime numbers are numbers which have only 2 factors i.e. one and itself.

- Order of prime numbers = {2, 3, 5, 7, 11, 13, 17, 19, 23, 29, …..}

Note: There is no pattern in prime numbers. To get the next prime number you use the fact of prime numbers having only 2 factors i.e. one and itself

6.Composite number.

These are numbers with more than two factors. (opposite of prime numbers)

Order of composite numbers = {4, 6, 8, 9, 10, 12, 14, 15, 16, ……}

Note: Composite numbers are numbers with more than two factors. So to get the next composite number, you use the fact of composite numbers having more than two factors.

- Square numbers are numbers got by multiplying a number by itself / squaring a number. e.g.

$1^2 = 1 \times 1 = 1$ $5^2 = 5 \times 5 = 25$ $9^2 = 9 \times 9 = 81$

$2^2 = 2 \times 2 = 4$ $6^2 = 6 \times 6 = 36$ $10^2 = 10 \times 10 = 100$

$3^2 = 3 \times 3 = 9$ $7^2 = 7 \times 7 = 49$ $11^2 = 11 \times 11 = 121$

$4^2 = 4 \times 4 = 16$ $8^2 = 8 \times 8 = 64$ $12^2 = 12 \times 12 = 144$

Square numbers are also got by adding consecutive odd numbers from 1.e.g

$1 = 1$

$1+3 = 4$

$1+3+5 = 9$

$1+3+5+7 = 16$

$1+3+5+7+9 = 25$

$1+3+5+7+9+11 = 36$

$1+3+5+7+9+11+13 = 49$

$1+3+5+7+9+11+13+15 = 64$

$1+3+5+7+9+11+13+15+17 = 81$

etc.

OR

1,   4,   9,   16,   25,   36,   49,   64,   81,   **100**

+3   +5   +7   +9   +11   +13   +15   +17   +19

The order of square numbers = {1, 4, 9, 16, 25, 36, 49, 64, 81,100,...}

When finding numbers in the sequence;

(i) first identify if the sequence is of any type of numbers and if they are follow the working of that particular type of numbers.

(ii) identify the pattern, sometimes the pattern is of a certain type of numbers.

(iii) if the sequence is in ascending order, you need to either add or multiply to get the next numbers and if the sequence is in descending order, you need to either subtract or divide to get next numbers.

NB: Prime numbers and Composite numbers have no pattern.

Exercise

1. List the following numbers between 10 and 20.(Numbers should be listed in a set)

a) Counting numbers

d) Prime numbers

b) Odd numbers

e) Composite numbers

c) Even numbers

d) Square numbers

2. Find the next number in the sequence

a) 0, 2, 4, 6, 8, 10, ____

g) 1, 3, 4, 6, 7, 9, ____

b) 17, 15, 13, 11,   ____

h) 1, 2, 4, 5, 7, ____

c) 1, 2, 4, 7, 11, ____

i) 1, 4, 9, 16, 25, 36,____

d) 2, 4, 7, 12, 19, ____

j) 2, 3, 5, 7, 11, 13, ____

f) 21, 18, 14, 9, ____

Day 2 week 2

1. <u>**Triangular numbers:**</u>

   These numbers are got by adding consecutive counting numbers from 1. The 1st triangular number is 1
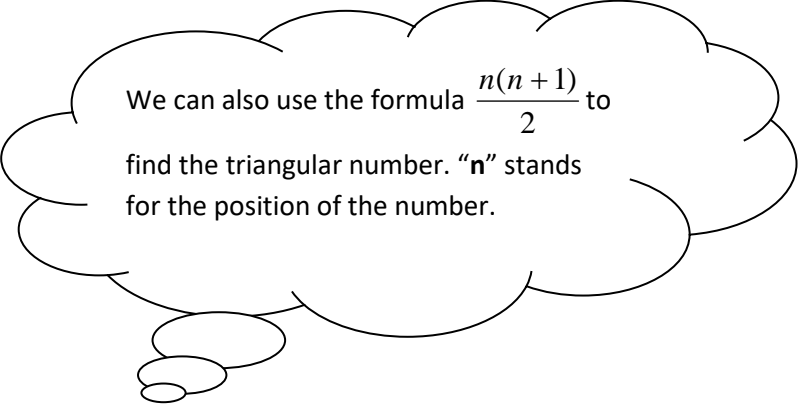
   Eg   1 = <u>1</u>

          1+2 = <u>3</u>

          1+2+3 = <u>6</u>

          1+2+3+4 = <u>10</u>

          1+2+3+5 = <u>15</u>

          1+2+3+5+6 = 2<u>1</u>

   *We can also use the formula $\dfrac{n(n+1)}{2}$ to find the triangular number. "**n**" stands for the position of the number.*

- Order of triangular numbers = {1, 3, 6, 10, 15, 21,...}

   To use the formula to get the 5th triangular number.

   $$\frac{n(n+1)}{2} = \frac{5(5+1)}{2} = \frac{5(6)}{2} = \frac{5x6}{2} = \frac{30}{2} = 15$$

   Note: Finding the 5th triangular number is the same as adding the first 5 counting/natural numbers

2. <u>**Cube numbers**</u>

   These are numbers obtained by multiplying counting number by itself three times / cubing a number.

   Eg. 1^3 = 1x1x1 = <u>1</u>

          2^3 = 2x2x2 = <u>8</u>

          3^3 = 3x3x3 = <u>27</u>

          4^3 = 4x4x4 = <u>64</u>

- Order of cube number = {1, 8, 27, 64, ...}

3. <u>**Integers:**</u>

   These are a combination of negatives, positives with zero. Zero is a neutral number i.e it is neither a positive nor a negative number
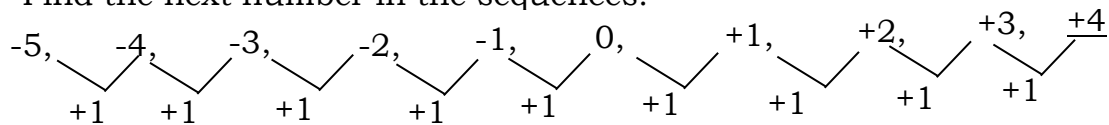
   Eg. –ve integers = {-2, -1, ...}
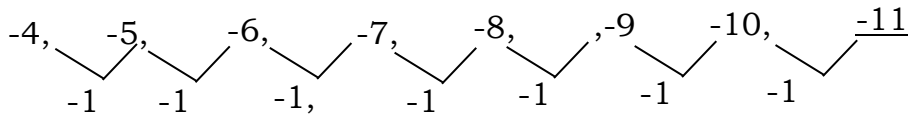
       +ve integers = {+2, +1, ...}

        With zero = {-2, -1, 0, 1, 2, ...}

   The pattern in the integers is 1. You keep on adding 1 to get to the next number in an ascending sequence and you keep on subtracting 1 to get the next number in a descending sequence.

Find the next number in the sequences.

-5,   -4,   -3,   -2,   -1,   0,   +1,   +2,   +3,   +4

+1   +1   +1   +1   +1   +1   +1   +1   +1

+3+1=+4

-4,   -5,   -6,   -7,   -8,   ,-9   -10,   -11

-1   -1   -1,   -1   -1   -1   -1

-10-1= -11

4. **Rational numbers**:

These are numbers which can be written as fractions / they are the same as fractions

e.g = $\{{}^1/_2, {}^2/_9, {}^3/_4, \dots\dots\dots\dots\}$

EXERCISE

1. Find the square of 6.

a) 1, 8, 27, 64, _____

2. Workout the sum of the first 7 counting numbers

b) + 4, + 5, + 6, + 7, + 8, _____

3. Find the 4th triangular number.

c) + 3, + 2, + 1, 0, -1, -2, -3, _____

4. Find the 20th triangular number.

d) -9, -8, -7, -6, -5, -4, _____

5. Find the value of 4^3.

6. Find the next number in the

sequences

Day 3 week 2

Consecutive numbers

-Counting numbers.

-Even numbers.

-Odd numbers.

Finding Consecutive Numbers Counting Numbers/Natural Numbers/Integers

The pattern of whole numbers, Counting numbers/ natural numbers and integers is 1. i.e. to get the next number, you add 1. e.g. If the 1st whole number is 2, then to get the next number will be 2+1 giving us 3 and if the 1st number is k, then the 2nd number will be k+1 and the 3rd number will be k+1+1 which is the same as k+2.

Examples

1.The sum of 3 consecutive counting or natural number is 93. What are these numbers?

Let the 1st counting number be a.

1st	2nd	3rd	Sum
a	a + 1	a + 2	93

1st	2nd	3rd
a	a + 1	a + 2
30	30 + 1	30 + 2
	31	32

a + a + 1 + a + 2 = 93

a + a + a + 1 + 2 = 93

3a + 3 = 93

3a + 3 – 3 = 93- 3

$\frac{3a}{3} = \frac{90}{3}$

a = 30

∴ The numbers are 30, 31 and 32.

2.   The sum of four consecutive counting numbers is 18. Find the numbers.

Let the first number be r.

1st No.	2nd No.	3rd No.	4th No.	Sum
r	r + 1	r + 2	r+3	18

r + r + 1 + r + 2 + r+3 = 18

r + r + r + r+1 + 2 +3 = 18

4r + 6 = 18

4r + 6 – 6 = 18 – 6

4r = 12

$\frac{4r}{4} = \frac{12}{4}$

r = 3

1st no. = r

    = 3

2nd No. = r + 1 but r = 3　　　　　　4th No. = r + 2

    = 3+ 1　　　　　　　　　　　　　= 3 + 3

    = 4　　　　　　　　　　　　　　= 6

3rd No. = r + 2　　　　　　　　　**The numbers are 3, 4, 5,and 6**

    = 3 + 2 = 5

Exercise

1. The sum of 2 consecutive counting numbers is 21. Find the numbers.

2. Find the 3 consecutive natural numbers whose sum is 51.

3. List the 3 consecutive integers whose sum is 72.

4. The sum of 4 consecutive natural numbers is 86. Find the range of the numbers.

5. The sum of 3 consecutive counting numbers is 39. Find the fourth number.

Day 4 week 2

<u>FINDING CONSECUTIVE ODD NUMBERS AND EVEN NUMBERS</u>

The pattern of odd numbers and even numbers is 2. i.e. to get the next number, you add 2. e.g. If the 1st odd or even number is b, then the 2nd number will be b+2 and the 3rd number will be b+2+2 which is the same as b+4.

1. The total of 3 consecutive odd numbers is 69. Find the range of these numbers.

Let the first no. be x.

1st	2nd	3rd	Total
x	x + 2	x + 4	69

$$x + x + 2 + x + 4 = 69$$

$$x + x + x + 2 + 4 = 69$$

$$3x + 6 = 69$$

$$3x + 6 - 6 = 69 - 6$$

$$\frac{3x}{3} = \frac{63}{3}$$

$$x = 21$$

1st	2nd	3rd
x	x + 2	x + 4
21	21 + 2	21 + 4
	23	25

∴The numbers are 21, 23 and 25.

2.   The sum of three consecutive even numbers is 54. Find the numbers, given that y is the largest number.

1st	2nd	3rd	Total[sum]
y - 4	y - 2	y	54

y-4 + y-2 + y = 54

y + y + y – 4 – 2 = 54

$\qquad$ 3y – 6 = 54

$\qquad$ 3y – 6 + 6 = 54 + 6

$\qquad$ 3y =60

$$\frac{3y}{3} = \frac{60}{3}$$

$\qquad$ y= 20

1st	2nd	3rd
y – 4	y – 2	y
20 – 4	20 – 2	20
16	18	

The numbers are 16, 18 and 20.

3.The median of 3 consecutive even numbers is n. find the three numbers if their total is 24.

1st	2nd	3rd	Total
n - 2	n	n + 2	24

$\qquad$ n – 2 + n + n + 2 = 24

$\qquad$ n + n + n + 2 – 2 = 24

$$\frac{3n}{3} = \frac{24}{3}$$

$$n = 8$$

1st	2nd	3rd
n-2 8 – 2=6	n 8	n + 2 8 + 2=10

∴ **The numbers are 6, 8 and 10**.

1. The sum of 3 consecutive odd numbers is 15. Find the numbers.

Let the first number be y.

1st No.	2nd No.	3rd No	Total
y	y + 2	y + 4	15

y + y + 2 + y + 4 = 15

y + y + y = 2 + 4 = 15

3y + 6 = 15

3y + 6 – 6 = 15 – 6

3y = 9

$$\frac{3y}{3} = \frac{9}{3}$$

y = 3

1st No. y = 3

2nd No = y + 2

=3 + 2

= 5

3rd No. = y + 4

=3 + 4

= 7

The numbers are 3, 5, and 7

2. Find the four consecutive even numbers whose sum is 172.

Let the 1st even number be k.

1st	2nd	3rd	4th	SUM
k	k+ 2	k+ 4	k + 6	172

k+ k + 2 + k + 4 + k + 6 = 172

k + k + k + k + 2 + 4 + 6 = 172

4k + 12 = 172

4k + 12 – 12 = 172 – 12

4k=160

$$\frac{4k}{4} = \frac{160}{4}$$

k= 40

1st	2nd	3rd	4th
y	y + 2	y + 4	y + 6

40	40+2	40+4	40+6
	42	44	46

The numbers are 40, 42, 44 and 46.

Exercise

1. The sum of 3 consecutive even numbers is 42. Find the numbers.

2. The sum of 4 consecutive even numbers is 52. Find the range of the numbers.

3. Find the set of three consecutive even numbers whose sum is 216.

4. Find the set of three consecutive odd numbers whose total is 189.

5. The sum of three consecutive odd numbers is 45. Find the numbers.

Day 5 week 2

Application of Lowest Common Multiple (L.C.M)

1.Find the smallest number that can be exactly divided by 6 or 8

L.C.M of 6 and 8.

M_6 = {6, 12, 18, 24, 30...}

M_8 = {8, 16, 24, 32, 40 ...}

Number = LCM

= 24

2. What is the smallest number of pancakes that can be shared among 8 or 9 boys leaving a remainder of 5 pancakes?

M_8 = {8, 16, 24, 32, 40, 48, 56, 64, 72...}

M_9 = {9, 18, 27, 36, 45, 54, 63, 72, 81...}

Number = LCM + Remainder

= 72 + 5

= 77 pancakes

3. At Buyala Primary school, two bells are rung to change lessons at intervals of 30 minutes and 40 minutes respectively.

a)   After how many hours will the bells be rung together again?

LCM of 30 and 40

2	30	40
2	15	20
2	15	10
3	15	5
5	5	5
	1	1

LCM= 2 x 2 x2 x 3 x 5

= 8 x 15

= 120 minutes

60 minutes = 1 hour

I minute = $\frac{1}{60}$hr

120 minutes = $\frac{120}{60}$ hr

= 2 hour

You can also use the method of listing multiples to find the LCM

The two bells will be rung after 2 hours.

b)   If the bells were first rung together at 8:15a.m. At what time will they be rung together again?

```
        Hrs        Mins

      8    :      15am

  + 2    :      00

    10    :      15am
```

They will be rung at 10:15am.

Primary mtcs for Uganda Bk 6 page 53.

1. Find the least number which is exactly divisible by 9 and 12.

2. What is the smallest number of sweets that can be shared by either 4 or 6 pupils leaving 5 sweets as a reminder?

3. Two bells rings at intervals of 30 Min and 40 minutes respectively if thy rang for the first time at 8:30 am

(a) After how long will they ring together again?

b) At what time did they ring together again?

4. Two bells are used in a certain school at intervals of 30 minutes and 40 minutes respectively. They are first rung together at 8:45a.m, when will the two bells ring together again?

3. Bulangiti buses leave for Kasese every 3 hours and Gateway buses leave for Soroti every four hours. Two buses set off from Kampala's bus park at 7:30am. When will the two buses leave together again?