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ACTIVITY - I

Create different activities to realize concept attainment by children in any unit from mathematics textbooks of 6-10 classes.

CONCEPT OF ALGEBRIC EXPRESSIONS

AIM :- To explain the algebric expressions.

CONCEPT :- Algebric expressions.

APPARATUS :- Black Board, Chalk pieces, duster.

DEFINATION :- Algebra is one of the branches of mathematics that involves letters of an alphabet numbers and mathematical operators.

INTRODUCTION :-

VARIABLES :- Variables can be take different values they have no fixed value, but they are numbers.

(or)

If it is not a constant is called variables.

Examples :- x, y, z, ... etc.

CONSTANT :- In algebric constant is a number (or) fixed value.

Example :- 1, 2, 3, 4, 5, ...

TERM :- An algebric expression is a mathematical phrase that can contain ordinary numbers variables (x, y .....) and operators (addition, substraction, multiply and division)

Example :- x, 5, 3x and 4x+3

In this 4x and 3 are terms, whereas, 4x is algebric term and 3 is numeric term.

EXPRESSION :- The combination of variable and constant

In some operation are used. i.e addition, substraction, multiply and divide.
Example :- $x+y$, $7x+5$, $3x+2y$ etc.

(Or)

An expression is a single term (or) a combination of terms connected by the symbols (+) plus or (-) minus. Example :- $6x+3y$, $3x^2+2x-y$, etc.

Multiplication (x) and division (÷) do not separate terms for example $2x \times 3y$ and $2x/3y$ are single terms.

ADDITION :- The sum of two (or) more like terms is a like term with a numerical coefficient equal to the sum of numerical co-efficients of all the like terms in addition.

Example :-

$$\begin{array}{r} 9x^2+5xy+7y^2 \\ 6x^2-2xy+y^2 \quad (+) \\ \hline 14x^2+3xy+8y^2 \end{array}$$

SUBSTRACTION :- The difference between two like terms is a like term with a numerical coefficient equal to the difference between the numerical co-efficient of the two terms.

Example :-

$$\begin{array}{r} 12xy+9x^2-5y^2 \\ (-)\ xy+13x^2+2y^2 \\ \hline 11xy-4x^2-7y^2 \end{array}$$

PROCEDURE :- Change the signs of each term in the expressions being substracted then add.

ACTIVITY-1

TEACHEY :- Good morning children. I'm your new math teacher. Myself Abha Arepita Pradhan.

Introduce yourself. Any two of you come forword. One is Saroj and the other is Sudhir. Saroj needs 150 rupees. He borrowed some money from Sudhir. Now Saroj has 210 rupees. Now students can you tell how much money Sudhir gave to Saroj? Now i will explain that 150 rupees + borrowed money = 210 rupees.
This borrowed money is an unknown quantity. let this unknown quantity be x. So, $150+x=210$.
After solving we get '60' as the answer. The value of $x=60$. Instead of x, we can also use any other letters of english alphabet. The above equation is in the form of algebric Expression.

ACTIVITY-2

Good morning Children. Have you been ever to the market. Ram went to market. Ram buy a dozen banana per 'p' rupees. But bananas needed for the school picnic are 'q' dozens.

Then we have to pay = $p \times q$

Suppose, the picnic price per dozen was less by 5 rupees. and the bananas needed were less by 6 dozens. The price of bananas per dozen = $p-5$

and

Banana as needed $(q-4)$ dozens.

$\therefore$ we have to pay = $(p-5) \times (q-4)$

It is in the form of Algebric expression.
In place of p, q we can use any letter of English alphabet.

ACTIVITY-II

Each student has to collect and present history and contribution of one Indian (or) western mathematician.

MATHEMATICIAN :- ARYABHATTA

Aryabhatta was the great Hindu mathematician He was born in 476 AD at Pataliputra known as Patna in Bihar. He lived in Patna from 476 AD to 550 AD. He was studied in Nalanda University which was the most popular in days. But some historians says that he was born in South India Kerala, Tamilnadu, Andhrapradesh, Some other says that he was born in East India, Bengal. After completing his studies he made a great mathematical territise Aryabhatiya in the age of twenty three in 499 AD and it made him popular in world wide and he became the vice-chancellor of "Nalanda University".

The Aryabhatta is a small astronomical treatise written in 118 verses giving a summary of Hindu mathematics up to that time. The Aryabhatta contain an introduction of 10 verses, followed by a section of mathematics 33 verses. then a section of 25 verses. and planetory models. with the final section of 50 verses being on the sphere and Eclipses. The mathematical part of Aryabhatia covers Arithmatic algebra, plane, trigonometry and spherical trigonometry.

CONTRIBUTION TO MATHEMATICS :-

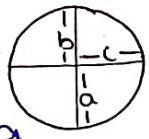
→ He gave the value of π as 3.1416 as an appropriate value, for the first time.

→ He prepared for table sines.

→ He gave the formula for area of triangle.

→ He gave formula for the area of circle.
→ He prepared arithmatic table.
→ $am-b=c$ was solved by him and was appreciated by world wide mathematicians.
→ He sugested the use of letters variably.
→ The place value system now use are is given by him.
→ He foremulated for the first time in India. the formulae for interest, time and other related ones. in the problems of interests.
→ He declared that number of days per year is 365.35 modern scientist confirmed it as 365 days 5 hours 48 minutes and 46 seconds.
→ He explained how to find out cube root.
→ He explained the formula to findout square root.
→ The earth takes 23 hours 56 minutes and 4.1 seconds per one revolution. But the modern scientist with the modern equipments declared it as 23hrs 56 minutes and 4.091 seconds.
→ He gave the formula to find the length of the radius of a circle.
→ He gave the procedure to finding out the volume of prism.
→ His contribution in geometry are commendable. The famous pythagrous theorem is seen in the following form in his work. "The square of Bheja plus the square of koti is the square of karna".
→ In a circle the product of two sarad is the square of the half chored of the arcs.

$axb = c^2$ (which c is the chord)



→ He derived the procedure for finding the circumference of a circle.

He made a mention of following algebraic identities in his book.

$$(a+b)^2 = a^2+2ab+b^2$$

The identities like the following are found in Aryabhatiya for the first time in the history of mathematics.

$$1^2+2^2+3^2+4^2+\cdots\cdots+n^2 = \frac{1}{6}n(n+1)(2n+1)$$

$$1^3+2^3+3^3+4^3+\cdots\cdots+n^3 = (1+2+3+\cdots+n)^2$$

$$= \frac{1}{4}n^2(n+1)^2$$

Aryabhatta in addition to mathematics was also the master of astronomy. He for the first time boldly declared that "Diurnal motion of the heavens is due to the rotation of the earth about an axis"

CONCLUSION :-

In this way Aryabhatta was much a head of his time. As a token of respect to him, the Government of India named the satellite which was sent in to space on 19-04-1975 as "Aryabhatta". Surely he was an irremovable Place in the history of mathematics.

An institute for conducting research in astronomy astrophysics and atmospheric science in the Aryabhatta research Institute of Observational Sciences near nainital, India.

ACTIVITY - III

Preparation of T.L.M. for any one topic from 1-10 mathematics.

INTRODUCTION :-

The Observation from of T.L.M. is teaching increasing material. The material which is caused for teaching learning is called Teaching learning material.

CLASSIFICATION OF T.L.M. :-

Teaching learning Material

- Audio
- Visual
- audio-Visual

Based on use of two master Organs i.e eyes and ears, teaching method is classified as,

1. Audio Aids
2. Visual Aids
3. Audio-Visual Aids.

1. Audio Aids :-

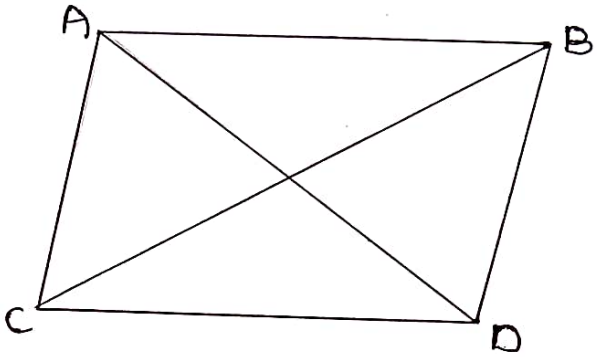
These aids invite the use of Sense of hearing and include radio, tape, records, CDs, microphone headphones etc.

These merits and demerits of radio and tape records are same. The remedy auditory aids have little provision to use as teaching material in mathematics teachings.

2. Visual Aids :-

These aids invite the use of Sense of sight and hence called as visual aids. Students

gain knowledge through only seeing. The type of visual materials include display boards, charts, models, motion pictures, films, strips, slides, 2D, 3D materials etc.



For example, I use diagrams, models for teaching It is kind of visual material. I prepare diagram for teaching quadrilateral to 8th class (parallelogram)

Defination of parallelogram :—

1. It is a four side polygon having opposite sides of equal length.
2. Diagonal are bisect each other.
3. The sum of angles is 360°.

Here, AB = CD and

AC = BD

and $\angle A + \angle B + \angle C + \angle D = 360°$

AD and BC are two diagonal of ABCD parallelogram.

3. Audio-Visual Materials :—

These materials invite the use of sense by hearing and seeing. There included educational films and educational televisions.

1. Educational Films :—

An educational film is one, which contributes to the achievement of desirable educational goals by making an effective use of motion pictures as a medium of communication. The films make the concept clear, durable and realistick. They have helped in developing and modifying the teaching techniques.

Educational films are categorized generally as classroom film, School made films. industrial films, Documentary films, News-reels etc.

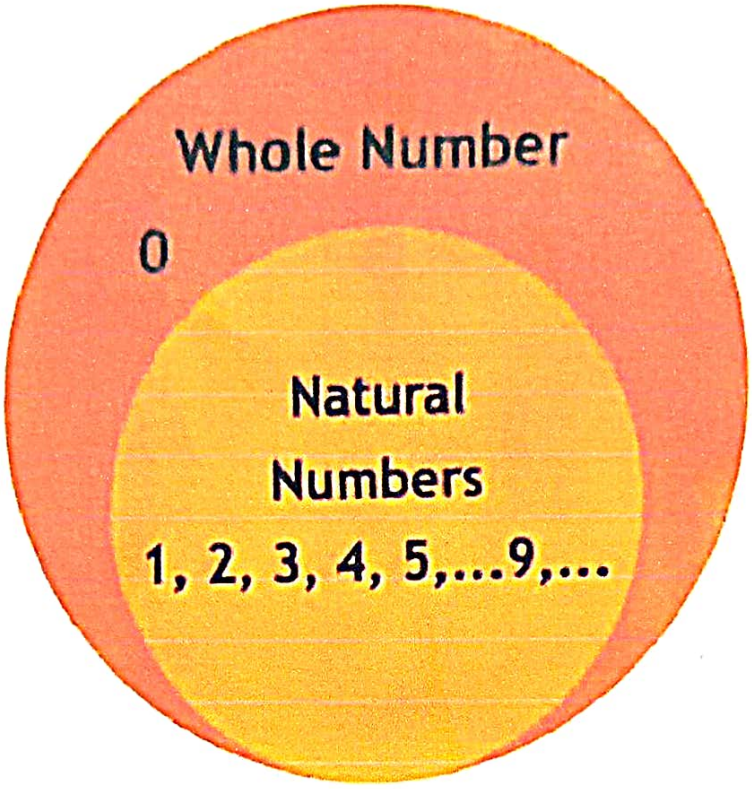
There are many films showing the different concept of mathematics and school activities, Some films are produced by the government which have real value of mathematics.

2. Educational Television :—

This is the latest addition to the list of a number of audio visual aids. It combines the radio and the potentialities of the films. So it is called as 'Queen of audio visual aids". It is also means of mass communication. That appeals to both the eye and ear.

ACTIVITY - IV

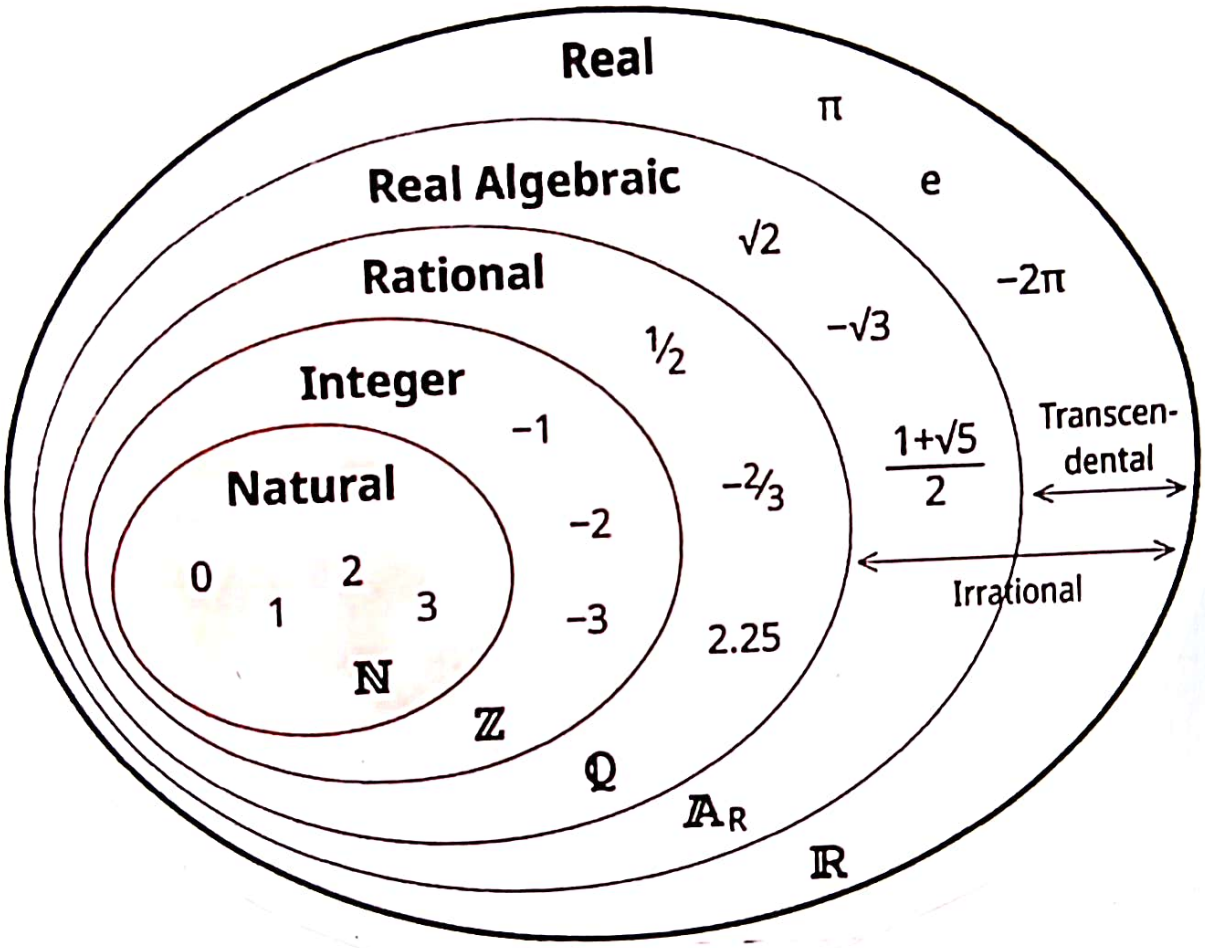
Natural Numbers



Natural Number

A natural number is an integer greater than o. Natural numbers begin at 1 and increment to infinity: 1, 2, 3, 4, 5, etc. Natural numbers are also called "counting numbers" because they are used for counting. For example, if you are timing something in seconds, you would use natural numbers (usually starting with 1). When written, natural numbers do not have a decimal point (since they are integers), but large natural numbers may include commas, e.g. 1,000 and 234,567,890. Natural numbers will never include a minus symbol (-) because they cannot be negative.

In computer science, natural numbers are commonly used when incrementing values. For example, in a for loop, the counter often increases by one with each iteration. Once the counter hits the limit [e.g., 10 in for (i=1; i<10; i++)], the loop is broken and the code after the loop is processed.


Real
π
e
Real Algebraic
√2
−2π
Rational
−√3
1/2
Integer
−1
1+√5
2
Transcen-
dental
Natural
−2/3
−2
0
2
1
3
−3
2.25
Irrational
ℕ
ℤ
ℚ
𝔸R
ℝ

First 50 natural numbers

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31
32 33 34 35 36 37 38
39 40 41 42 43 44 45
46 47 48 49 50

SUMMARY

- Counting (Natural) numbers: 1,2,3,4,5,6,7...
- Whole numbers: 0,1,2,3,4,5,6,7...
- Integers: ...,-5,-4,-3,-2,-1,0,1,2,3,4,5,...
- Rational numbers: -7/2,4/5,1/3,-4/6
- Irrational numbers: √2,√3,√5,√7
- Real numbers: -5,-4,-2,-1,0,1,2, √2,√3,√5,√7,1.2,3.4

THANK YOU

ACTIVITY - V

Identify Suitable methods / approaches of teaching topics from mathematics text of anyone class. (Inductive / Deductive) Analytic / Synthetic / Laboratory Heuristic / Project methods and activity based learning)

Suitable methods / approaches and teaching different topics from mathematics textbooks.

Class :- 8th class

1. Sum of two numbers is 19 and one number Exceeds from another by 7. find the numbers?

→ To teach this concept - I Suggested Analytical method.

ANALYTICAL METHOD :—

The word analytic is derived from the word analysis which means breaking up (or) resolving a thing into its constituent elements. This method is based on analysis and therefore in this method we brake up the problem into instant parts. So that it is ultimately gets connected with something ovious already known From abstract to concrete and complex to simple. Analysis means breaking up problems in hand. So that it is ultimately connected with already known.

→ Let the Smallest number be 'x', then the bigger number will be $7+x$.

→ But it is given that sum of these two number is 19.

$$x+x+7=19$$
$$2x+7=19$$
$$2x=19-7=12$$
$$\Rightarrow 2x=12$$
$$\Rightarrow x=\frac{12}{2}=6$$

$\therefore n = 6$

The smaller number be $n = 6$ and bigger number will $n+7 = 6+7 = 13$.

2. Hemant get 28% discount on this shirt. He paid 300 rupees after discount. find the marked price of shirt.?

↳ To teach this concept II suggested synthesis method.

SYNTHESIS METHOD :—

It is opposite to analytical method. Here we proceed from known to unknown. It is the complement of analysis. To synthesize means to place together things that are apart. It is starts with something already known and connects with unknown.

Solution :—

Then the discount is 28% of n

She paid n - 28% of $n = 300$

n - 28% of $n = 300$

$\Rightarrow n - \frac{28}{100} \times n = 300 \Rightarrow \frac{100n - 28n}{100} = 300$

$\Rightarrow 72n = 300 \times 100 \Rightarrow n = \frac{300 \times 100}{72} = 417$

$\Rightarrow n = 417$

$\therefore$ Market price of the shirt in 417 rupee.

3 Geometrical proof of the identity $(a+b)(a-b) = a^2 - b^2$

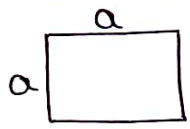
↳ To teach this concept - III suggested inductive method.

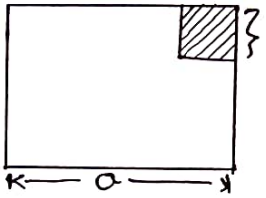
INDUCTIVE METHOD :—

Inductive method is based on induction. Induction is proving a universal (nth) theorem by showing that is true in particular case. It is true in next case of same serial order. In this method we proceed from particular to general from concrete to abstract rules and results can be generalized from facts.

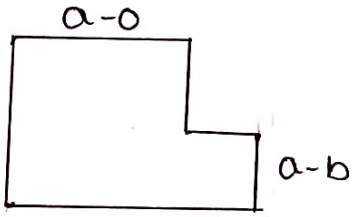
Solution :— $a^2 - b^2 =$ (Area of square where side is a) − (Area of square where side is b)

Observe the following square. Remove the square from this is b (where side is b)





we get



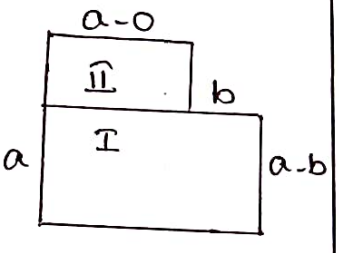
It consists of two parts.

So, a^2-b^2 = Area of Fig-I + area of Fig-II

$= a(a-b)+b(a-b)$

$= (a-b)(a+b)$

Thus, $a^2-b^2 = (a+b)(a-b)$



4. Find $(4x+5y)(4x-5y)$ by using $(a+b)(a-b) = a^2-b^2$

→ To teach this concept suggested deductive method

Deductive Method :—

It is the opposite of inductive method. It proceeds from general to particular, abstract to concrete and from formula to problem. A pre-established formula is given to the students and they are asked to solve the relevant problems with help of that formula. It involves application of formula to solve problems.

Solution :— $(4x+5y)(4x-5y)$

$(a+b)(a-b) = a^2-b^2$

$= (4x)^2-(5y)^2 = 16x^2-25y^2$

5. Find $(987)^2-13^2$ by using $(a+b)(a-b) = a^2-b^2$

To teach this concept suggested deductive method.

Solution :— $(987)^2-(13)^2$

$(a^2-b^2) = (a+b)(a-b)$

$= (987+13)(987-13)$

$= 9,74,000$