

Activity 15

OBJECTIVE

To construct a Pascal's Triangle and to write binomial expansion for a given positive integral exponent.

MATERIAL REQUIRED

Drawing board, white paper, matchsticks, adhesive.

METHOD OF CONSTRUCTION

1. Take a drawing board and paste a white paper on it.
2. Take some matchsticks and arrange them as shown in Fig.15.

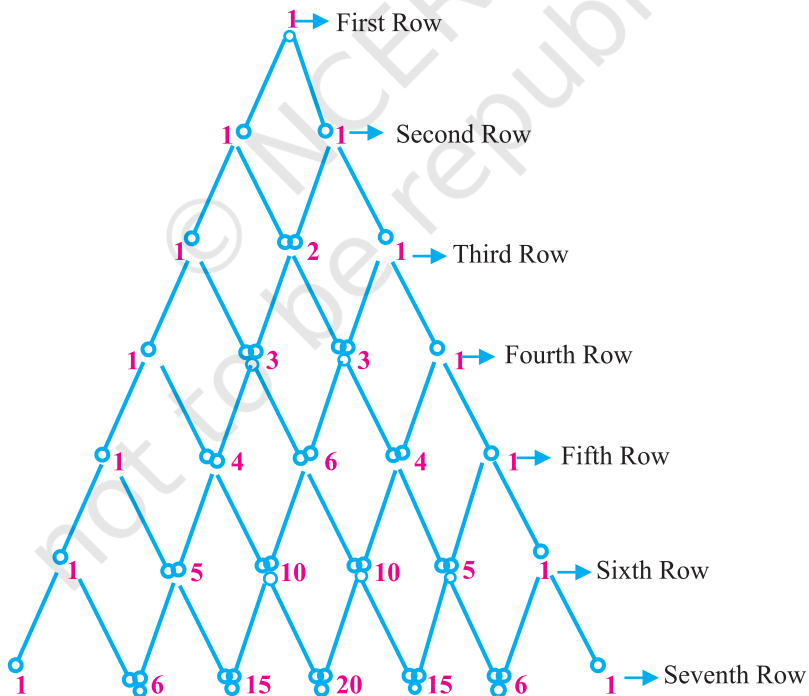


Fig. 15

3. Write the numbers as follows:

1 (first row)

1 1 (second row)

1 2 1 (third row)

1 3 3 1 (fourth row), 1 4 6 4 1 (fifth row) and so on (see Fig. 15).

4. To write binomial expansion of $(a + b)^n$, use the numbers given in the $(n + 1)^{\text{th}}$ row.

DEMONSTRATION

1. The above figure looks like a triangle and is referred to as Pascal's Triangle.
2. Numbers in the second row give the coefficients of the terms of the binomial expansion of $(a + b)^1$. Numbers in the third row give the coefficients of the terms of the binomial expansion of $(a + b)^2$, numbers in the fourth row give coefficients of the terms of binomial expansion of $(a + b)^3$. Numbers in the fifth row give coefficients of the terms of binomial expansion of $(a + b)^4$ and so on.

OBSERVATION

1. Numbers in the fifth row are _____, which are coefficients of the binomial expansion of _____.
2. Numbers in the seventh row are _____, which are coefficients of the binomial expansion of _____.
3. $(a + b)^3 = ___ a^3 + ___ a^2b + ___ ab^2 + ___ b^3$
4. $(a + b)^5 = ___ + ___ + ___ + ___ + ___ + ___.$
5. $(a + b)^6 = ___ a^6 + ___ a^5b + ___ a^4b^2 + ___ a^3b^3 + ___ a^2b^4 + ___ ab^5 + ___ b^6.$
6. $(a + b)^8 = ___ + ___ + ___ + ___ + ___ + ___ + ___ + ___ + ___.$
7. $(a + b)^{10} = ___ + ___ + ___ + ___ + ___ + ___ + ___ + ___ + ___ + ___ + ___.$

APPLICATION

The activity can be used to write binomial expansion for $(a + b)^n$, where n is a positive integer.