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National Institute of Open Schooling (NIOS)
Senior Secondary Course
Lesson – 12: Binomial Theorem
Worksheet -12

1. Using Binomial Theorem, evaluate the value of $(103)^5$ and verify it.

2. Expand $\left(1+x+x^4\right)^4$ in power of *x*.

3. Simplify and hence $(x+y)^6+(x-y)^6$ evaluate $\left(\sqrt{3}+1\right)^6+\left(\sqrt{3}-1\right)^6$.

4. If A be the sum of odd terms and B be the sum of even terms in the expansion of $(x+a)^n$, prove that

(A) $A^2-B^2=\left(x^2-a^2\right)^n$

(B) $4AB=(x+a)^{2n}-(x-a)^{2n}$

5. Using binomial theorem, prove that 6^n-5n always leaves the remainder 1, when divided by 25, for all $n\in N$.

6. Find the co-efficient of x^5 in the expansion of $(1+x)^{21}+(1+x)^{22}+$ ……. $+(1+x)^{30}$

7. If *a, b* are distinct integers, prove that a^n-b^n is divisible by $(a-b)$, for all $n\in N$.

8. If the co-efficient of three consecutive terms in the expansion of $(1+x)^n$ as 76, 95 and 76, then find the value of *n*.

9. Show that the expansion of $\left(x^2+\frac{1}{x}\right)^{12}$ does not contain any term involving x^{-1}

10. If *a, b, c* and *c* in any binomial expansion be the 6th, 7th, 8th and 9th terms respectively, then justify $\frac{b^2-ac}{c^2-bd}=\frac{4a}{3c}$.