

Mathematical Induction and Binomial Induction

- 1) $1 + 2 + 3 + \dots + n =$
- A) $\frac{n^2(n+1)^2}{4}$
B) $\frac{n(n+1)}{2}$
C) $\frac{n(n+1)(2n+1)}{6}$
D) $\frac{n^2}{2}$
- 2) The number of terms in the expansion of $(2x + y)^6$ are
- A) 6
B) 7
C) 8
D) 14
- 3) $1^2 + 2^2 + 3^2 + \dots + n^2 =$
- A) $\frac{n(n+1)}{2}$
B) $\frac{n(n+1)(2n+1)}{6}$
C) $\frac{n^2(n+1)^2}{4}$
D) $\frac{n^2}{2}$
- 4) $1^3 + 2^3 + 3^3 + \dots + n^3 =$
- A) $\frac{n^2}{2}$
B) $\frac{n(n+1)(2n+1)}{6}$
C) $\frac{n(n+1)}{2}$
D) $\frac{n^2(n+1)^2}{4}$
- 5) If x is so small that its square and higher powers be neglected then $(1 + 3x)^{-2} =$
- A) $1 + 9x$
B) $1 - 9x$
C) $1 + 6x$
D) $1 - 6x$
- 6) For every positive integer n
 $1 + 5 + 9 + \dots + (4n - 3)$ is equal to
- A) $n(2n - 1)$
B) $(2n - 1)$
D) $n - 1$
D) n
- 7) When we expand $(a + 2b)^2$ then
- A) $a^5 + 10a^4b + 40a^3b^2 + 80a^2b^3 + 80ab^4 + 32b^5$
B) $a^5 + a^4b + a^3b^2 + a^2b^3 + ab^4 + b^5$
C) $5a^5 + 4a^4b + 3a^3b^2 + 2a^2b^3 + 1ab^4 + b^5$
D) None of above
- 8) The term involving x^4 in the expansion of $(3 - 2x)^7$ is
- A) 120
B) 1512
C) 1250
D) 15120
- 9) if $1 + \frac{1}{4} + \frac{1.3}{4.8} + \frac{1.3.5}{4.8.12} + \dots + R$ is
- A) $\sqrt{2}$
B) $\sqrt{3}$
C) $\sqrt{5}$
D) $\sqrt{7}$
- 10) For each natural number n .
 $1 + 3 + 5 + \dots + (2n - 1) = \dots$
- A) n^2
B) n
C) n^3
D) n^4

- 11 $(a + x)^n = \sum_{r=0}^n \binom{n}{r} a^{n-r} x^r$ where a and x are:
 A) imaginary
 B) Rational
 C) Irrational
 D) Real numbers
- 12 Number of terms in the expansion of $(a + x)^n$ is
 A) $n - 1$
 B) $n + 1$
 C) $n + 2$
 D) $n + 3$
- 13 The expansion of $(1 - \frac{5}{8}x)$ is valid when:
 A) $x < \frac{8}{5}$
 B) $x < \frac{5}{8}$
 C) $|x| < \frac{8}{5}$
 D) $|x| > \frac{8}{5}$
- 14 ${}^n C_2 =$ exists when n is
 A) $n > 2$
 B) $n \leq 2$
 C) $n < 2$
 D) $n \geq 2$
- 15 1st four terms of the expansion $(1 - x)^{-2}$ are
 A) $1 + 2x + 3x^2 + 4x^3$
 B) $3x^2 + 2x + 1$
 C) $1 + 3x + 4x^2 + 5x^3$
 D) None of these
- 16 The expansion $(1 + x)^{-3}$ holds when
 A) $|x| > 1$
 B) $|x| < 1$
 C) $|x| > 1$
 D) $x < 1$
- 17 The middle term of the expansion $(1 + 2x)^6$ is
 A) 1st term
 B) 4th term
 C) 2nd term
 D) 3rd term
- 18 If n is odd the expansion $(a + x)^n$ has middle terms.
 A) 2
 B) 3
 C) 4
 D) 5
- 19 The general term of expansion $(a + x)^n$ is:
 A) a^{n-r}
 B) $\binom{n}{r}$
 C) $\binom{n}{r} a^{n-r} x^r$
 D) None of above

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