MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

BINOMIAL THEOREM

Others

1. Find the 9th term in the expansion of $\left(\dfrac{x}{a} - \dfrac{3a}{x^2}\right)^{12}$.

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2. Find the 4th term from the end in the expansion of $\left(\dfrac{3}{x^2} - \dfrac{x^3}{6} \right)^7$.

3. Using binomial theorem, indicate which is larger $(1.1)^{10000}$ or 1000?

4. Show that $2^{4n+4} - 15n - 16$, where $n \in N$ is divisible by 225.

5. Show that the middle term in the expansion

$$\left(x - \frac{1}{x}\right)^{2n} \, is \, \frac{1.\,3.\,5(2n-1)}{n}(-2)^n \, .$$

6. Find the coefficients of $x^{32} \, and \, x^{-7}$ in the

expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$.

7. Find the middle term in the expansion $\left(\dfrac{2}{3}x^2 - \dfrac{3}{2x}\right)^{20}$.

8. Find the middle terms in the expansion $\left(3x - \dfrac{x^3}{6}\right)^{7}$.

9. Find the coefficient of x^4 in the expansion of $\left(1 + x + x^2 + x^3\right)^{11}$.

10. The term independent of x in expansion of

$$\left(\frac{x+1}{x^{\frac{2}{3}} - x^{\frac{1}{3}} + 1} - \frac{x-1}{x - x^{\frac{1}{2}}} \right)^{10}$$ is (1) 120 (2) 210 (3)

310 (4) 4

11. Prove that there is no term involving x^6 in the

expansion of $\left(2x^2 - \frac{3}{x} \right)^{11}$, where $\neq 0$.

12. Find the term independent of x in the expansion of $\left(3x^2 - \dfrac{1}{2x^3}\right)^{10}$.

13. Find the coefficient of x^{50} after simplifying and collecting the like terms in the expansion of

$$(1+x)^{1000} + x(1+x)^{999} + x^2(1+x)^{998} + \ + x^{1000}.$$

14. Find the coefficient of x^n in the expansion of

$$(1+x)(1+x)^n.$$

15. If a_1, a_2, a_3, a_4 be the coefficient of four consecutive terms in the expansion of $(1 + x)^n$, then prove that: $\dfrac{a_1}{a_1 + a_2} + \dfrac{a_3}{a_3 + a_4} = \dfrac{2a_2}{a_2 + a_3}$.

16. Find the number of integral terms in the expansion of $\left(5^{\frac{1}{2}} + 7^{\frac{1}{8}}\right)^{1024}$.

17. Find the coefficients of x^7 in $\left(ax^2 + \dfrac{1}{bx}\right)^{11}$ and x^{-7} in $\left(ax - \dfrac{1}{bx^2}\right)^{11}$ and find the relation between a and b so that coefficients are equal.

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18. Find the coefficient of x^5 in the expansion of $(1+x)^{21} + (1+x)^{22} + \ldots\ldots\ldots + (1+x)^{30}$.

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19. If the middle term in the binomial expansion of $\left(\dfrac{1}{x} + x\sin x\right)^{10}$ is equal to $\dfrac{63}{8}$, find the value of x.

20. Find the greatest value of the term independent of x in the expansion of $\left(x\sin\alpha + \dfrac{\cos\alpha}{x}\right)^{10}$, where $\alpha \in R$.

21. If o be the sum of odd terms and E that of even terms in the expansion of $(x + a)^n$ prove that: (i) $O^2 - E^2 = (x^2 - a^2)^n$ (ii) $4OE = (x + a)^{2n} - (x - a)^{2n}$ (iii) $2(O^2 + E^2) = (x + a)^{2n} + (x - a)^{2n}$

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22. Using binomial theorem, expand $\left\{ (x + y)^5 + (x - y)^5 \right\}$. and hence find the value of $\left\{ (\sqrt{2} + 1)^5 + (\sqrt{2} - 1)^5 \right\}$.

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23. Using binomial theorem, prove that $2^{3n} - 7n - 1$ is divisible by 49 , where $n \in N.$

24. Using binomial theorem, prove that $(101)^{50} > 100^{50} + 99^{50}.$

25. Expand $\left(x^2 + 2a\right)^5$ by binomial theorem.

26. Prove that $\displaystyle\sum_{r=0}^{n} {}^{\wedge} nC_r 3^r = 4^n$

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27. By using binomial theorem, expand:

$\left(1 + x + x^2\right)^3$ 、

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28. If the third term in the expansion of

$\left(\dfrac{1}{x} + {}_x(\log)_{10x}\right)^5$ is 1000, then find x.

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29. In the binomial expansion of $(1+x)^n$, coefficients of the fifth, sixth and seventh terms are in A.P. find all the values of n for which this can happen.

30. In the binomial expansion of $(a+b)^n$, coefficients of the fourth and thirteenth terms are equal to each other. Find n .

31. The value of term independent of x in $\left(\sqrt{x} + \dfrac{a}{x^2}\right)^{10}$ is .

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32. If n is a positive integer, prove that $3^{3n} - 26n - 1$ is divisible by 676.

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33. Using binomial theorem, prove that $3^{2n+2} - 8^n - 9$ is divisible by 64, where $n \in N$.

34. For what value of x is the ninth term in the expansion of $\left(3^{\log_3 \sqrt{25^{x-1}+7}} + 3^{-\frac{1}{8}\log_3\left(5^{x-1}+1\right)} \right)^{10}$ is equal to 180

35. If the fourth term in the expansion of $\left\{ \sqrt{\dfrac{1}{x^{\log(x+1)}}} + \dfrac{1}{x^{12}} \right\}^6$ $is equal \to 200$ and x >1,` then find x

36. If the coefficient of 2nd, 3rd and 4th terms in the expansion of $(1+x)^{2n}$ are in A.P. , show that $2n^2 - 9n + 7 = 0$.

37. If the coefficient of $(2r+4)th$ and $(r-2)th$ terms in the expansion of $(1+x)^{18}$ are equal, find r .

38. Find the value of α for hich the coefficients of the middle terms in the expansions of $(1 + \alpha x)^4 and (1 + \alpha x)^6$ are equal, find α.

39. If the term free form x in the expansion of $\left(\sqrt{x} - \dfrac{m}{x^2} \right)^{10}$ is 405, find the value of m.

40. Find the 5th term in the expansion of $\left(1 + x^2 \right)^{12}$

41. Find the $2nd$ term in the expansion of $(1 + x)^{12}$

42. Find the total number of the terms in expansion of $(1 - 3x + 3x^2 - x^3)^8$.

43. Find the 111th term in the expansion of $(1 + 3x)^{111}$.

44. Find the number of terms in the expansion of $(a + b)^8$.

45. Write last two digits of the number 3^{400}.

46. Find the total number of terms in the expansion of $\left(x^{\frac{3}{2}} + x^{\frac{1}{2}} \right)^{10}$.

47. If n is a positive integer, find the coefficient of x^{-1} in the expansion of $(1 + x)^n \left(1 + \dfrac{1}{x} \right)^n$.

48. Find the sixth term in the expansion $\left(y^{\frac{1}{2}} + x^{\frac{1}{3}} \right)^n$, if the binomial coefficient of the third

term of the end is 45.

49. Which term in the expansion of

$$\left\{ \left(\frac{x}{\sqrt{y}} \right)^{\frac{1}{3}} + \left(\frac{y}{(x)^{\frac{1}{3}}} \right)^{\frac{1}{2}} \right\}^{21}$$ contains x and y to

one and the same power ?

50. Find the number of terms in the expansions of the following: $(2x - 3y)^9$

51. Find the number of terms in the expansions of the following: $\left(1 + 5\sqrt{2}x\right)^9 + \left(1 - 5\sqrt{2}x\right)^9$

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52. Find the number of terms in the expansions of the following: $\left(\sqrt{x} + \sqrt{y}\right)^{10} + \left(\sqrt{x} - \sqrt{y}\right)^{10}$

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53. Find the number of terms in the expansions of the following: $\left[(3x + y)^8 - (3x - y)^8 \right]$

54. Find the number of terms in the expansions of the following: $(2x + 3y - 4z)^n$

55. Find the number of terms in the expansions of the following: $(1 + 2x + x^2)^{20}$

56. Expand $(2x - 3y)^4$ by binomial theorem.

57. Using binomial theorem expand $\left(1 + \dfrac{x}{2} - \dfrac{2}{x}\right)^4$, $x \neq 0$.

58. Find the expansion of $(3x^2 - 2ax + 3a^2)^3$ using binomial theorem.

59. Using binomial theorem, expand $\left(x + \dfrac{1}{y}\right)^{11}$.

60. Find an approximation of $(0.99)^5$ using the first three terms of its expansion.

61. Using binomial theorem compute : $(99)^5$

62. Using binomial theorem compute : $(102)^6$

63. Using binomial theorem compute : $(10.1)^5$

64. Write down the binomial expansion of $(1+x)^{n+1}$, when x=8. Deduce that $9^{n+1} - 8n - 9$ is divisible by 64 where, n is a positive integer.

65. Using binomial theorem, prove that $6^n - 5n$ always leaves he remainder 1 when divided by 25.

66. Which is larger $(1.01)^{100000}$ or $10,000$?

67. If $a \; and \; b$ are distinct integers, prove that $a^n - b^n$ is divisible by $(a - b)$ where $n \in \mathbb{N}$.

68. Using binomial theorem, write down the expansion of $(2x + 3y)^5$

69. Using binomial theorem, write down the expansions of the following: $(1 - 3x)^7$

70. Using binomial theorem, write down the expansions of the following: $\left(x3 - a3\right)^6$

71. Using binomial theorem, write down the expansions of the following: $\left(1 - 2x + 3x^2\right)^3$

72. Using binomial theorem, write down the expansions of the following: $(2x - 3y)^4$

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73. Using binomial theorem, write down the expansions of the following: $\left(ax - \dfrac{b}{x}\right)^5$

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74. Using binomial theorem, write down the expansions of the following: $\left(1 + 2x - 3x^2\right)^5$

75. Using binomial theorem, write down the expansions of the following: $\left(x - \dfrac{1}{x} \right)^6$

76. Using binomial theorem, write down the expansions of the following: $\left(\sqrt{\dfrac{x}{a}} - \sqrt{\dfrac{a}{x}} \right)^6$

77. Using binomial theorem, write down the expansions of the following: $\left(x + 1 - \dfrac{1}{x}\right)^3$

78. Evaluate the following: $\left(\sqrt{x+1} + \sqrt{x-1}\right)^6 + \left(\sqrt{x+1} - \sqrt{x-1}\right)^6$

79. Evaluate the following: $\left(3 + \sqrt{2}\right)^5 - \left(3 - \sqrt{2}\right)^5$

80. Evaluate the following:

$$\left(1 + 2\sqrt{x}\right)^5 + \left(1 - 2\sqrt{x}\right)^5$$

81. Evaluate the following: $\left(\sqrt{3} + 1\right)^5 - \left(\sqrt{3} - 1\right)^5$

82. Evaluate the following:

$$\left(\sqrt{3} + \sqrt{2}\right)^6 - \left(\sqrt{3} - \sqrt{2}\right)^6$$

83. Evaluate the following:

$$\left\{a^2 + \sqrt{a^2 - 1}\right\}^4 + \left\{a^2 - \sqrt{a^2 - 1}\right\}^4$$

84. Evaluate the following:

$$\left(x + \sqrt{x^2 - 1}\right)^6 + \left(x - \sqrt{x^2 - 1}\right)^6$$

85. Evaluate the following: $\left(\sqrt{2} + 1\right)^6 + \left(\sqrt{2} - 1\right)^6$

86. Evaluate the following: $\left(2 + \sqrt{3}\right)^7 + \left(2 - \sqrt{3}\right)^7$

87. Evaluate the following: $(0.99)^5 + (1.01)^5$

88. Find $(a + b)^4 - (a - b)^4$. Hence evaluate $\left(\sqrt{3} + \sqrt{2}\right)^4 - \left(\sqrt{3} - \sqrt{2}\right)^4$

89. Find $(x + 1)^6 + (x - 1)^6$. Hence evaluate $(\sqrt{2} + 1)^6 + (\sqrt{2} - 1)^6$.

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90. Using binomial theorem evaluate each of the following: $(96)^3$

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91. Using binomial theorem evaluate each of the following: $(102)^5$

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92. Using binomial theorem evaluate each of the following: $(101)^4$

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93. Using binomial theorem evaluate each of the following: $(98)^5$

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94. Using binomial theorem indicate which is larger $(1.\,1)^{10000}$ or 1000?

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95. Write the general term in the expansion of $\left(x^2 - y\right)^6$.

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96. Find the 10th term in the binomial expansion of $\left(2x^2 + \dfrac{1}{x}\right)^{12}$.

97. Find the 6th term in the expansion of $\left(\dfrac{4x}{5} - \dfrac{5}{2x}\right)^{9}$.

98. Find 13th term in the expansion of $\left(9x - \dfrac{1}{3\sqrt{x}}\right)^{18}$, $x \neq 0$.

99. Find the 11th term from the end in the expansion of $\left(2x - \dfrac{1}{x^2} \right)^{25}$.

100. Find n, if the ratio of the fifth term from the beginning to the fifth term from the end in the expansion of $\left(\sqrt[4]{2} + \dfrac{1}{\sqrt[4]{3}} \right)^{n}$ is $\sqrt{6} : 1$.

101. Find a if 17th and 18th terms in the expansion of $(2 + a)^{50}$ are equal.

102. Show that the middle term in the expansion of $(1 + x)^{2n}$ is $\dfrac{1.3.5...(2n - 1)}{n!} \cdot 2^n \cdot x^n$, where $n \in N$.

103. Prove that the coefficient of the middle term in the expansion of $(1 + x)^{2n}$ is equal to the sum of

the coefficients of middle terms in the expansion of

$$(1 + x)^{2n - 1}$$

104. Find the coefficient of x^{10} in the binomial expansion of $\left(2x^2 - \dfrac{3}{x} \right)^{11}$, $when \ x \neq 0$.

105. Find the coefficient of $x^6 y^3$ in the expansion of

$$(x + 2y)^9.$$

106. Find the coefficient of x^{40} in the expansion of $\left(1 + 2x + x^2\right)^{27}$.

107. Find the coefficient of x^5 in the expansioin of the product $\left(1 + 2x\right)^6\left(1 - x\right)^7$.

108. Find the term independent of x in the expansion of: $\left(x - \dfrac{1}{x}\right)^{12}$.

109. Find the term independent of x in the expansion of: $\left(2x - \dfrac{1}{x}\right)^{10}$.

110. In the binomial expansion of $(1 + a)^{m+n}$, prove that the coefficient of a^m and a^n are equal.

111. Prove that the coefficients of x^n in $(1 + x)^{2n}$ is twice the coefficient of x^n in $(1 + x)^{2n-1}$.

112. Find a positive value of m for which the coefficient of x^2 in the expansion f $(1 + x)^m$ is 6.

113. If the coefficients of $(r - 5)^{th}$ and $(2r - 1)^{th}$ terms in the expansion of $(1 + x)^{34}$ are equal, find r.

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114. The coefficient of three consecutive terms in the expansion of $(1 + x)^k$. Are in the ratio $1 : 7 : 42$ find the value of k.

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115. If the coefficients of a^{r-1}, a^r and a^{r+1} in the binomial expansion of $(1 + a)^n$ are in A.P., prove

that $n^2 - n(4r + 1) + 4r^2 - 2 = 0$.

116. The coefficients of $(r - 1)^{th}$, rth and $(r + 1)^{th}$ terms in the expansion of $(x + 1)^n$ are in the ratio 1:3:5. Find n and r.

117. If the fourth term in the expansion of $\left(ax + \dfrac{1}{x}\right)^n$ is $\dfrac{5}{2}$, then find the values of a and n.

118. The sum of the coefficients of first three term in the expansion of $\left(x - \dfrac{3}{x^2}\right)^m$, $x \neq 0$. m being a natural number, is 559. Find the term of the expansion containing x^3.

119. If x^p occurs in the expansion of $\left(x^2 + 1/x\right)^{2n}$, prove that its coefficient is

$$\dfrac{(2n)!}{\left[\frac{1}{3}(4n - p)\right]! \left[\frac{1}{3}(2n + p)\right]!}.$$

120. The coefficient of x^m in $(1+x)^m + (1+m)^{m+1} + \ldots + (1+x)^n$, $m \le n$ is

121. If in the expansion of $(1-x)^{2n-1}$ a_r denotes the coefficient of x^r then prove that $a_{r-1} + a_{2n-r} = 0$

122. If 3rd, 4th, 5th terms in the expansion of $(x + a)^n$ be 84, 280 and 560, Find x, a and n.

123. Find the number of terms which are free from radical signs in the expansion of $\left(y^{1/5} + x^{1/10}\right)^{55}$.

124. Find the 11th term form the beginning and the 11th term form the end of the expansion of

$$\left(2x - \frac{1}{x^2} \right)^{25}.$$

125. Find the 7th term in the expansion of

$$\left(3x^2 - \frac{1}{x^3} \right)^{10}.$$

126. Find the 5th term from the end in the expansion

of $\left(3x - \frac{1}{x^2} \right)^{10}.$

127. Find the 7th term in the expansion of $\left(\dfrac{4x}{5} + \dfrac{5}{2x} \right)^8$.

128. Find the 4th term from the beginning and 4th term from the end in the expansion of $\left(x + \dfrac{2}{x} \right)^9$

129. Find the 4th term from the end in the expansion of $\left(\dfrac{4x}{5} - \dfrac{5}{2x} \right)^9$.

130. Find the 7th term from the end in the expansion

of $\left(2x^2 - \dfrac{3}{2x}\right)^8$.

131. Find the coefficient of x^{10} in the expansion of

$\left(2x^2 - \dfrac{1}{x}\right)^{20}$.

132. Find the coefficient of x^7 in the expansion of $\left(x - \dfrac{1}{x^2}\right)^{40}$.

133. Find the coefficient of : x^{-15} in the expansion of $\left(3x^2 - \dfrac{a}{3x^3}\right)^{10}$.

134. Find the coefficient of x^9 in the expansion of $\left(x^2 - \dfrac{1}{3x}\right)^{9}$.

135. Find the coefficient of x^m in the expansion of $\left(x + \dfrac{1}{x}\right)^n$.

136. The co-efficient of x in the expansion of $\left(1 - 2x^3 + 3x^5\right)\left(1 + \dfrac{1}{x}\right)^8$ is :

137. Find the coefficient of $a^5 b^7 \in (a - 2b)^{12}$

138. Find the coefficient of x in the expansion of $\left(1 - 3x + 7x^2\right)(1 - x)^{16}$.

139. Does the expansion of $\left(2x^2 - \dfrac{1}{x}\right)^{20}$ contain any term involving x^9?

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

141. Find the middle term in the expansion of $\left(\dfrac{2x}{3} - \dfrac{3}{2x}\right)^{20}$

142. Find the middle term in the expansion of :

$$\left(x^2 - \frac{2}{x}\right)^{10}$$

143. Find the middle term in the expansion of :

$$\left(\frac{a}{x} + bx\right)^{12}$$

144. Find the middle term in the expansion of :

$$\left(\frac{x}{a} - \frac{a}{x}\right)^{10}$$

145. Find the middle term in the expansionansion of
$$\left(3x - \frac{x^3}{6}\right)^9.$$

146. Find the middle term in the expansion of :
$$\left(3x - \frac{2}{x^2}\right)^{15}$$

147. Find the middle term in the expansion of

$$\left(2x^2 - \frac{1}{x} \right)^7$$

148. Find the middle term in the expansion of :

$$\left(x^4 - \frac{1}{x^3} \right)^{11}$$

149. Find the middle term in the expansion of :

$$\left(x - \frac{1}{x} \right)^{10}$$

150. Find the middle term in the expansion of :

$$\left(1 + 3x + 3x^2 + x^3\right)^{2n}$$

151. Find the middle term in the expansion of :

$$\left(1 - 2x + x^2\right)^{n}$$

152. Find the middle term in the expansion of :

$$\left(2x - \frac{x^2}{4}\right)^9$$

153. The middle term of $\left(x - \dfrac{1}{x}\right)^{2n+1}$ is

154. Find the middle terms in the expansion

$$\left(3x - \frac{x^3}{6}\right)^7.$$

155. Find the middle term in the expansion of :

$$\left(\frac{p}{x} + \frac{x}{p} \right)^9$$

156. Find the middle term in the expansion of :

$$\left(\frac{x}{3} + 9y \right)^{10}$$

157. Find the middle term in the expansion of :

$$\left(2ax - \frac{b}{x^2}\right)^{12}$$

158. Find the middle term in the expansion of :

$$\left(\frac{x}{a} - \frac{a}{x}\right)^{10}$$

159. Term independent of x in the expansion of

$$\left(3x^2 - \frac{1}{3x}\right)^{9}.$$

160. Find the term independent of x in the expansion of $\left(2x^2 - \dfrac{3}{x^3}\right)^{25}$.

161. Find the term independent of x in the expansion of $\left(\sqrt{\dfrac{x}{3}} + \left(\dfrac{\sqrt{3}}{2x^2}\right)\right)^{10}$

162. Find the term independent of x in the expansion of the following expressions:

$$\left(1 + x + 2x^3\right)\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$$

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163. Find the term independent of x in the expansion of the following expression:

$$\left(\sqrt[3]{x} + \frac{1}{2\sqrt[3]{x}}\right)^{18}, \quad x > 2$$

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164. Find the term independent of x in the expansion off the following expression:

$$\left(2x + \frac{1}{3x^2} \right)^9$$

165. Find the term independent of x in the expansion off the following expression:

$$\left(3x - \frac{2}{x^2} \right)^{15}$$

166. Find the term independent of x in the expansion off the following expression:

$$\left(x - \frac{1}{x^2}\right)^{3n}$$

167. Find the term independent of x in the expansion of $\left(1 + x + 2x^3\right)\left[\left(3x^2/2\right) - \left(1/3x\right)\right]^9$

168. Find the term independent of x in the expansion off the following expression:

$$\left(\frac{3}{2}x^2 - \frac{1}{3x} \right)^6$$

169. If the coefficients of $(2r+1)th$ term and $(r+2)th$ term in the expansion of $(1+x)^{48}$ are equal, find r.

170. how that the coefficient of (r+1) th in the expansion of $(1 + x)^{n+1}$ is equal to the sum of the coefficients of the r th and (r+1) th term in the expansion of $(1 + x)^n$

171. Prove that the term independent of x in the expansion of $\left(x + \dfrac{1}{x} \right)^{2n}$ is $\dfrac{1.\ 3.\ 5...(2n - 1)}{n!} \cdot 2^n$.

172. If the coefficients of 5th, 6th , and 7th terms in the expansion of $(1 + x)^n$ are in A.P., then $n =$ a. 7 only b. 14 only c. 7 or 14 d. none of these

173. If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1 + x)^{2n}$ are in A.P. Then find the value of n.

174. If in the expansion of $(1 + x)^n$, the coefficients of pth and qth terms are equal, prove that $p + q = n + 2$, where $p \neq q$.

175. Find a if the coefficients of x^2 and x^3 in the expansion of $(3 + ax)^9$ are equal.

176. Find the coefficient of a^4 in the product $(1 + 2a)^4 (2 - a)^5$ using binomial theorem.

177. In the expansion of $(1+x)^n$ the binomial coefficients of three consecutive terms are respectively 220, 495 and 792 find the value of n.

178. If in the expansion of $(1+x)^n$ the coefficient of three consecutive terms are 56,70 and 56, then find n and the position of the terms of these coefficients.

179. If in any binomial expansion a, b, c and d be the 6th, 7th, 8th and 9th terms respectively, prove that

$$\frac{b^2 - ac}{c^2 - bd} = \frac{4a}{3c}$$

180. If the coefficients of three consecutive terms in the expansion of $(1 + x)^n$ be 76, 95 and 76 find n.

181. If the 6th, 7th, 8th terms in the expansion of $(x + y)^n$ be 112, 7 and 1/4 find x, y and n.

182. If the 2nd, 3rd and 4th terms in the expansion of $(x + a)^n$ are 240, 720 and 1080 respectively, find $x, a, n.$

183. Find a, b and n in the expansion of $(a + b)^n$ if the first three terms of the expansion are 729, 7290

and 30375, respectively.

184. If p is a real number and if the middle term in the expansion of $\left(\frac{p}{2} + 2\right)^8$ is 1120, find p

185. Write the number of terms in the expansion of $\left(2 + \sqrt{3}x\right)^{10} + \left(2 - \sqrt{3}x\right)^{10}.$

186. Write the middle term in the expansion of $\left(\dfrac{2x^2}{3} + \dfrac{3}{2x^2}\right)^{10}$.

187. Which term is independent of x in the expansion of $\left(x - \dfrac{1}{3x^2}\right)^9$?

188. If a and b denote respectively the coefficients of $x^m and$ x^n in the expansion of $(1 + x)^{m+n}$, then

write the relation between $a \text{ and } b$.

189. Write the middle term in the expansion of $\left(x + \dfrac{1}{x}\right)^{10}$.

190. If $a \text{ and } b$ denote the sum of the coefficients in the expansions of $\left(1 - 3x + 10x^2\right)^n$ and $\left(1 + x^2\right)^n$ respectively, then write the relation between $a \text{ and } b$.

191. Write the coefficient of the middle term in the expansion of $(1 + x)^{2n}$.

192. Find the sum of the coefficient of two middle terms in the binomial expansion of $(1 + x)^{2n-1}$

193. If a and b are the coefficients of x^n in the expansions of $(1 + x)^{2n}$ and $(1 + x)^{2n - 1}$ respectively, find $\dfrac{a}{b}$.

194. The total number of terms in the expansion of $(x + a)^{100} + (x - a)^{100}$ is:

195. If

$$\left(1 - x + x^2\right)^n = a_0 + a_1 x + a_2 x^2 + \cdots\cdots + a_{2n} x^{2n},$$

find the value of $a_0 + a_2 + a_4 + \ldots\ldots + a_{2n}$.

196. If the rth term in the expansion of $(1 + x)^{20}$ has its coefficient equal to that of the (r+ 4)th term, find r

197. The term without x in the expansion $\left(2x - \dfrac{1}{2x^2}\right)^{12}$ is a. 495 b. -495 c. -7920 d. 7920

198. If rth term in the expansion of $\left(2x^2 - \dfrac{1}{x} \right)^{12}$ is without x then r is equal to a. 7 b. 8 c. 9 d. 10

199. If in the expansion of $(a + b)^n$ and $(a + b)^{n+3}$, the ratio of the coefficients of second and third terms, and third and fourth terms respectively are equal, then n is a. 3 b. 4 c. 5 d. 6

200. If A and B are the sums of odd and even terms respectively in the expansion of $(x + a)^n$ then $(x + a)^{2n} - (x - a)^{2n} =$

201. The number of irrational terms in the expansion of $\left(4^{\frac{1}{5}} + 7^{\frac{1}{10}} \right)^{45}$ is

202. The coefficient of x^{-17} in the expansion of $\left(x^4 - \dfrac{1}{x^3} \right)^{15}$ is

203. In the expansion of $\left(x^2 - \dfrac{1}{3x}\right)^9$ the term without x is equal to a. $\dfrac{28}{81}$ b. $\dfrac{-8}{243}$ c. $\dfrac{28}{243}$ d. none of these

204. If in the expansion of $(1+x)^{15}$, the coefficients of $(2r+3)^{th}$ and $(r-1)^{th}$ terms are equal, then the value of r is a. 5 b. 6 c. 4 d. 3

205. The middle term of the expansion of $\left(\dfrac{2x^2}{3} + \dfrac{3}{2x^2}\right)^{10}$ is a. 251 b. 252 c. 250 d. none of these

206. If in the expansion of $\left(x^4 - \dfrac{1}{x^3}\right)^{15}$, x^{-17} occurs in rth term, then a. $r = 10$ b. $r = 11$ c. $r = 12$ d. $r = 13$

207. In the expansion of $\left(x - \dfrac{1}{3x^2} \right)^9$, the term independent of x is a. T_3 b. T_4 c. T_5 d. none of these

208. If the coefficients of 5th, 6th , and 7th terms in the expansion of $(1 + x)^n$ are in A.P., then $n =$ a. 7 only b. 14 only c. 7 or 14 d. none of these

209. Find the term independent of x in the expansion of the following expressions:

$$\left(\frac{1}{2}x^{\frac{1}{3}} + x^{-\frac{1}{5}} \right)^{8}$$

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210. If A and B respectively denote the sum of the odd terms and sum of the even terms in the expansion of $(x + y)^n$, then the value of $\left(x^2 - y^2\right)^n$, is equal to

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211. If the coefficient of x in the expansion of $\left(x^2 + \dfrac{k}{x}\right)^5$ is 270, then $k=$

212. The coefficient of x^4 in $\left(x/2 - 3/x^2\right)^{10}$ is $\dfrac{405}{256}$

b. $\dfrac{504}{259}$ c. $\dfrac{450}{263}$ d. none of these

213. The number of terms in the expansion of $(x + a)^{100} + (x - a)^{100}$ after simplification

214. If $\dfrac{T_2}{T_3}$ in the expansion of $(a + b)^n$ and $\dfrac{T_3}{T_4}$ in the expansion of $(a + b)^{n+3}$ are equal, then n is equal to

215. The coefficient of $1/x$ in the expansion of $(1 + x)^n (1 + 1/x)^n$ is $\dfrac{n!}{(n-1)!(n+1)!}$ b. $\dfrac{(2n)!}{(n-1)!(n+1)!}$ c. $\dfrac{(2n)!}{(2n-1)!(2n+1)!}$ d. none of these

216. The sum of the binomial coefficients of $\left[2x + \dfrac{1}{x}\right]^n$ is equal to 256. The constant term in the expansion is: (A) 1120 (B) 2110 (C) 1210 (D) none

217. If the fifth term of the expansion $\left(a^{2/3} + a^{-1}\right)^n$ does not contain $'a'$. Then n is equal to a. 2 b. 5 c. 10 d. none of these

218. The coefficient of x^{-3} in the expansion of $\left(x - \dfrac{m}{x}\right)^{11}$ is a. $-924m^7$ b. $-792m^5$ c. $-792m^6$ d. $-330m^7$

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219. The coefficient of the term independent of x in the expansion of $\left(ax + \dfrac{b}{x}\right)^{14}$ is a. $14!a^7b^7$ b. $\dfrac{14!}{7!}a^7b^7$ c. $\dfrac{14!}{(7!)^2}a^7b^7$ d. $\dfrac{14!}{(7!)^3}a^7b^7$

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220. The coefficient x^5 in the expansion of $(1+x)^{21} + (1+x)^{22} + + (1+x)^{30}$ is a. $^{51}C_5$ b. $^9C_5$ c. $^{31}C_6 - ^{21}C_6$ d. $^{30}C_5 + ^{20}C_5$

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221. The coefficient of $x^8 y^{10}$ in the expansion of $(x+y)^{18}$ is a. $^{18}C_8$ b. $^{18}P_{10}$ c. 2^{18} d. none of these

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222. If the coefficients of the $(n+1)^{th}$ term and the $(n+3)^{th}$ term in the expansion of $(1+x)^{20}$ are

equal , then the value of n is a. 10 b. 8 c. 9 d. none of these

223. If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1 + x)^n$, $n \in \mathbb{N}$ are in A.P, then n is a. 7 b. 14 c. 2 d. none of these

224. The middle term in the expansion of $\left(\dfrac{2x}{3} - \dfrac{3}{2x^2} \right)^{2n}$ is a. $^{2n}C_n$ b. $(-1)^n \, ^{2n}C_n \, x^{-n}$ c.

$^{2n}C_n x^{-n}$ d. none of these

225. If r^{th} term is the middle term in the expansion of $\left(x^2 - \dfrac{1}{2x} \right)^{20}$, then $(r+3)^{th}$ term is

226. The number of terms with integral coefficients in the expansion of $\left(17^{\frac{1}{3}} + 35^{\frac{1}{2}} \right)^{600}$ is (A) 100 (B) 50 (C) 150 (D) 101

227. Constant term in the expansion of $\left(x - \dfrac{1}{x} \right)^{10}$

is a. 152 b. -152 c. -252 d. 252

228. If the coefficients of x^2 and x^3 in the expansion of $(3 + ax)^9$ are the same, then the value of a is a. $-\dfrac{7}{9}$ b. $-\dfrac{9}{7}$ c. $\dfrac{7}{9}$ d. $\dfrac{9}{7}$