



MATHS

BOOKS - MAHAVEER PUBLICATION

PERMUTATIONS AND COMBINATIONS

Question Bank

1. Find the two-digit number (having different digits), which is divisible by 5.



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2. A Hall has 3 gates. In how many ways can a man enter the hall through one gate and come out through a different gate?



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3. If repetition is allowed, how many even numbers of two digits can be formed with the digits 1,2,3,4,5?



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4. Without repetition how many 4 digit numbers can be formed with the digits 1,3,5,7,9?



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5. How many different four-digit numbers greater than 6000 can be formed using the digit 1,2,4,5,6,7, if no digit can be repeated ?



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6. How many different four-digit numbers greater than 6000 can be formed using the digit 1,2,4,5,6,7, if repetitions are allowed ?



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7. How many different five digit numbers can be formed from the digit 1,2,3,4 and 5 if there are no restrictions on digits and repetitions are allowed :



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8. How many different five digit numbers can be formed from the digit 1,2,3,4 and 5 if the number is odd and no repetitions are allowed :



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9. How many different five digit numbers can be formed from the digit 1,2,3,4 and 5 if the number is even and repetitions are allowed :



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10. How many different five digit numbers can be formed from the digit 1,2,3,4 and 5 if the number is greater than 50,000 and no repetitions are followed ?



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11. Find the value : $5! - 3!$



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12. Find the value : $\frac{7!}{4!}$



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13. Find the value : $3! \times \frac{7!}{5!}$



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14. If n is a natural number then show that

$$n! + (n + 1)! = (n + 2)n!$$



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15. If n is a natural number then show that

$$1.3.5.7.\dots.(2n - 1) = \frac{(2n)!}{2^n n!}$$



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16. If ${}^{56}P_{r+6} : {}^{54}P_{r+3} = 30800$, find rP_2 .



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17. Prove that $\hat{\ } nP_r - 5^n P_r + r^{n-1} P_{r-1}$.



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18. How many 9 letters words can be formed using the letters of the word "COMMITTEE" ?



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19. A child has four pocket and three marbles. In how many ways can the child put the marbles in its pocket?



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20. Find the value : 6C_3



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21. Find the value : ${}^5C_4 + {}^7C_4$



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22. Find the value : $\frac{{}^7C_3}{{}^3C_2}$



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23.

If

$${}^n C_{r-1} = 36, {}^n C_r = 84 \text{ and } {}^n C_{r+1} = 126,$$

find n and r.



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24. How many ways 3 students can be selected from 50 students ?



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25. In how many ways can 11 players be selected from 14 players if

(i) a particular player is always included?

(ii) a particular player is never included?



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26. In how many ways can 11 players be selected from 14 players if

(i) a particular player is always included?

(ii) a particular player is never included?





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27. Find the number of 4 letter words that can be formed from the letters of the word "ALLAHABAD" .



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28. If ${}^n P_3 = 336$ find ${}^n C_3$



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29. If ${}^n C_5 = {}^n C_{12}$ find n.



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30. Find value of ${}^8 P_5, {}^6 C_3$.



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31. If ${}^{17} C_5 = {}^n C_{12}$ find n.



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32. (i) If ${}^{2n}C_3 : {}^nC_3 = 11 : 1$, find n .

(ii) If ${}^{2n}C_3 : {}^nC_2 = 12 : 1$, find n .



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33. 12 points lie on a circle. How many cyclic quadrilaterals can be drawn by using these points ?



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34. In a box there are 5 black pens, 3 white pens and 4 red pens. In how many pens can 2 black pens, 2 white pens and 2 red pens be chosen?



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35. In how many ways can 4 girls and 5 boys be arranged in a row so that all the four girls are together?



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36. How many arrangements of the letters of the word 'BENGALI' can be made if the vowels are never together.



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37. How many arrangements of the letters of the word 'BENGALI' can be made if the vowels are to occupy only odd places.



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38. Out of 9 girls and 13 boys how many different committees can be formed each consisting of 5 boys and 3 girls?



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39. From 10 boys and 20 girls, a committee of 2 boys and 3 girls is to be formed. In how many ways can this be done if a particular boy is included,



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40. From 10 boys and 20 girls, a committee of 2 boys and 3 girls is to be formed. In how many ways can this be done if a particular girl is included



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41. From 10 boys and 20 girls, a committee of 2 boys and 3 girls is to be formed. In how many ways can this be done if a particular girl is excluded



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42. Find the value of n if ${}^{n+1}P_3 = 4^n P_2$



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43. Find the value $\frac{8!}{6! \times 2!}$



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44. Find the value $4! \times 2!$



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45. Find the value ${}^{11}P_5$



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46. Find the value ${}^{14}P_{11}$



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47. (i) If ${}^{2n}C_3 : {}^nC_3 = 11 : 1$, find n .

(ii) If ${}^{2n}C_3 : {}^nC_2 = 12 : 1$, find n .



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48. Find n if ${}^nP_4 = 10 \times {}^nP_3$



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49. Find n if ${}^nC_{12} = {}^nC_8$



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50. Find n if ${}^n P_3 : {}^{n+1} P_3 = 5 : 12$



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51. If ${}^n C_{10} = {}^n C_5$ find ${}^n C_{14}$



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52. Find the value of r if ${}^n P_r = 3024$ and

$${}^n C_r = 126$$



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53. Find the value of r if ${}^{n-1}P_r : {}^n P_r = 2:3$

and ${}^n C_r : {}^{n+1} C_r = 9:13$, then find n and r



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54. If show that ${}^{n-1}P_r = (n - r) \cdot {}^{n-1} P_{r-1}$



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55.

Prove

that

$${}^n C_r + 2 \cdot {}^n C_{r-1} + {}^n C_{r-2} = {}^{n+2} C_r$$



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56. How many odd numbers of 5 distinct significant digits can be formed with 0,1,2,3,4 ?



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57. Find how many word can be formed of the letters in the word "FAILURE" so that the vowels main never may separated



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58. How many ways the letters of the word "RUBBER" can be arranged ?



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59. In how many ways can be letters of the word "MULTIPLE" be arranged without changing the order of the vowels in the word ?



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60. How many numbers of five digits can be formed without repetition if 2,3 and 5 always occur in each number



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61. How many numbers of five digits can be formed without repetition if 0 never occurs ?



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62. Six different colours are chosen to make a tri-colour flag. How many different flags can be made?



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63. How many chords can be drawn through 11 points on a circle?



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64. How many numbers of 4 digits can be formed with the odd digits without repeating any digit?



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65. How many words can be formed with the letters of the word 'PENCIL' beginning with C?



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66. In how many ways 7 books can be arranged from 10 books?



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67. From 50 students how many ways a group of 3 representative can be selected if a particular student is always included. From 50 students how many ways a group of 3 representative can be selected if a specific student is never included.



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68. In how many different ways can 8 examination papers be arranged in a row , so

that the best and the worst papers may never come together ?



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69. In how many ways a committee of 5 is to be formed from 6 boys and 4 girls, where the committee contains at least one girl.



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