

1. The number of possible interpersonal relationships increases dramatically as the size of a group increases. Determine the number of different two-person relationships that are possible in a group of people of size (a) 3, (b) 8, (c) 12, and (d) 20.
2. Find the number of diagonals in a Pentagon.
3. Find the number of diagonals in a Decagon.
4. Solve for n:  $14 \cdot {}_n P_3 = {}_{n+2} P_4$
5. Solve for n:  ${}_n P_5 = 18 \cdot {}_{n-2} P_4$
6. How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated?
7. How many 4-letter words with or without meaning, can be formed out of the letters of the word, 'LOGARITHMS', if repetition of letters is not allowed?
8. In how many different ways can the letters of the word 'MATHEMATICS' be arranged so that the vowels always come together?
9. In how many different ways can the letters of the word 'OPTICAL' be arranged so that the vowels always come together?
10. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?