

Show all your details work on separate sheet(s) (8½ x 11):

1. Show that the number of 3-letter words that can be formed using the letters of the word **background** is the same as the number of words obtained by rearranging the letters in the word **ground**.
2. A student has 4 mathematics books, 5 history books and 7 English books. In how many ways can he arrange his books on a shelf if books of the same subject are to be kept together?
3. How many arrangements of all the letters of the word **pentagon** can be formed if the word begins as follows,
 - (a) with a **p**?
 - (b) with **pe**?
 - (c) with a vowel?
4. How many words of 3 letters, beginning and ending with different consonants, and with the middle letter a vowel, can be formed from the letters of the word **beacon**?
5. Find the number of arrangements of the letters of the word **algebra** in which the two **a**'s are together.
6. In how many ways can 8 books be arranged on a shelf under the following restrictions?
 - (a) Two specific books must be side by side.
 - (b) Two specific books must not be side by side.
7. The letters **L, O, C, U, S** are placed on cards and a monkey arranges them to make a 5 letter word. How many mistakes can he make if he is trying to form the word **LOCUS**?
8. If the letters of word **special** are written in every possible way, how many of them will not begin with **sp**?
9. How many 5-digit odd numbers can be formed from the digits of the number 5 390 864?
10. Seven beads of different colours are strung on a string to make a bracelet. How many different arrangements are there?