

Permutation: Factorial Notation and Repeats

1. How many arrangements are the of the letters in the word FATHER if,
  - a. There are no restrictions
  - b. If the F has to be first
  - c. If the word starts and ends with a vowel
  - d. If the vowels have to be together
2. How many arrangements are the of the letters in the word EQUATION if,
  - a. There are no restrictions
  - b. If the T has to be last
  - c. If the word starts with the Q and ends with a vowel
  - d. If the vowels have to be together
3. How many arrangements are the of the letters in the word ANSWER if,
  - a. There are no restrictions
  - b. If the word begins with an S
  - c. If the three letters A N S, have to be together and in that order
  - d. If the three letters A N S, have to be together

4. Ann, Brian, Colin, Diane and Eric go the movie and sit in 5 adjacent seats. How many possible arrangements are there if
  - a. There are no restrictions.
  - b. Brian sits next to Diane
  - c. Ann refuses to sit next to Diane
5. Fifteen Rugby players line up for a team picture, with 7 players in the front row and 8 in the back row. How many different arrangements are possible if
  - a. There are no restrictions
  - b. The captain is in the middle of the front row
6. How many different arrangements are there using all the letters in the following words
  - a. COCHRANE
  - b. RED DEER
  - c. MILLARVILLE
  - d. WINNIPEG

7. Given the word TATTOO, determine the number of arrangements if
- a. The word starts with a T
  - b. Begins with two T's
  - c. Begins with three T's
  - d. Begins with a T, but the next letter is not a T
  - e. Begins with exactly two T's
8. At the Olympics there is a race with 8 runners. In how many orders can the countries finish if there are
- a. 2 Canadians, 1 Russian, 3 Americans, 1 Dutch and 1 Kenyan
  - b. 1 British, 2 Ethiopian, 2 Australian, 1 Mexican, 2 German