

MDM4U – Unit 1 – Permutations Assessment

Please do your solutions on your own paper. Show your solutions. Make sure you spread out your solutions so they are not cluttered. When completed, scan and submit your solutions.

Marks available are shown beside each question.

1. Write in simplest factorial form.

a) $10 \times 9 \times 8 \times 7!$ [1]

b) $90 \times 8!$ [2]

2. Evaluate: (Show your work.)

a) $\frac{1234!}{1232!}$ [2]

b) ${}_{15}P_6$ [1]

3. How many different arrangements can be made from the letters of the word CARLETON taken..

a) Three at a time [2]

b) Five at a time [2]

4. How many different arrangements can be made from the letters of the word SHERIDAN under each of the following conditions:
- a) The first letter is a D [2]
 - b) The letters HER must remain together in this order. [2]
 - c) The last letter must be a consonant [2]
 - d) The last letter must not be a consonant [2]
5. How many numbers less than 3 million can be formed using all the digits:
1 2 2 4 4 5 6 ? [4]
6. How many different arrangements can be made from the letters of the word PNEUMATICS if:
- a) There are no restrictions [2]
 - b) The first letter is an S [2]
 - c) The PN are together [2]
 - d) The letters PN can not be together. [2]

7. Find the number of ways of arranging the letters in the word COLUMBIAN if the second letter and the third letter in each arrangement must be a vowel and the last letter in each arrangement must be a consonant? [4]
8. How many ways can 8 people sit at a round table? [2]
9. Find the number of distinct 4 letter words that have at least one vowel by using the letters from the word GUELPH. [3]
10. In how many ways can you arrange the letters of the name KESSEL if the last two letters are S's. [2]
11. a) Create a Pascal's Triangle showing the rows up to and including row 7. [4]
- b.) What is $t_{6,3}$ [1]
- c) What is the sum of the numbers in row 24? [2]
- d) What row of Pascal's triangle has a sum of 262,144? [2]

12. Licence plates used to consist of three or four letters with the last letter always a vowel (there are 5 vowels) followed by three digits. It was know that 105 specific arrangements of the three letter were not allowed and 235 of the four letter arrangements are not allowed. Also, regarding the digits, repeat digits are not allowed. How many different licence plates are possible? [4]