

# Grade 12 Pre-Calculus

## Permutations & Combinations Final Assessment

NAME \_\_\_\_\_

Show your work for maximum potential marks.

1. Simplify the expression:  $\frac{(n+3)!}{(n+1)!n!}$  (2 marks)
2. In how many ways can you re-arrange the letters in the word **GUEST**? (1 mark)
3. The letters **A, A, A, D, K, R, R, V** are placed in a bag and randomly selected. In how many different ways can the letters be arranged? (2 marks)
4. How many three digit numbers with no repeating digits can be created using the digits 1, 4, 6, 7, 9? (1 mark)
5. How many **even** 5-digit whole numbers can be created? Repetition is allowed. (2 marks)

**Short Answer.**

6. Evaluate.

(1 mark & 2 marks)

a)  ${}_9P_2$

b)  $\frac{888!}{886!2!}$

7. Solve for  $n$ .

(3 marks each)

a)  $\frac{(n+1)!}{(n-2)!} = 20(n-1)$

b)  ${}_nP_2 = 156$

8. The MTS Centre in downtown Winnipeg has seven separate entrances/exits. Determine how many ways can you enter and then exit the building if:

a) You can choose whatever door(s) you want.

(1 mark)

b) You can't exit through the same door you entered.

(2 marks)

9. a) How many ways can you arrange six children to line up for a class photo? (1 mark)

b) How many ways can you arrange the six children if Moses (one of the children) **must** stand in the first position? (2 marks)

10. How many ways can nine friends sit in a row at a theatre if Cassie, Richard (two of the friends) **must not** sit together? (3 marks)

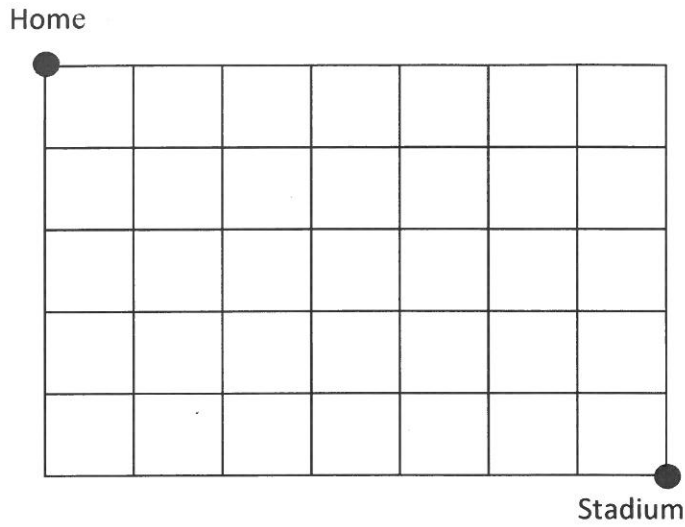
10. Determine the number of arrangements of all of the letters of the word **SECTION** if:

a) There are no restrictions. (1 mark)

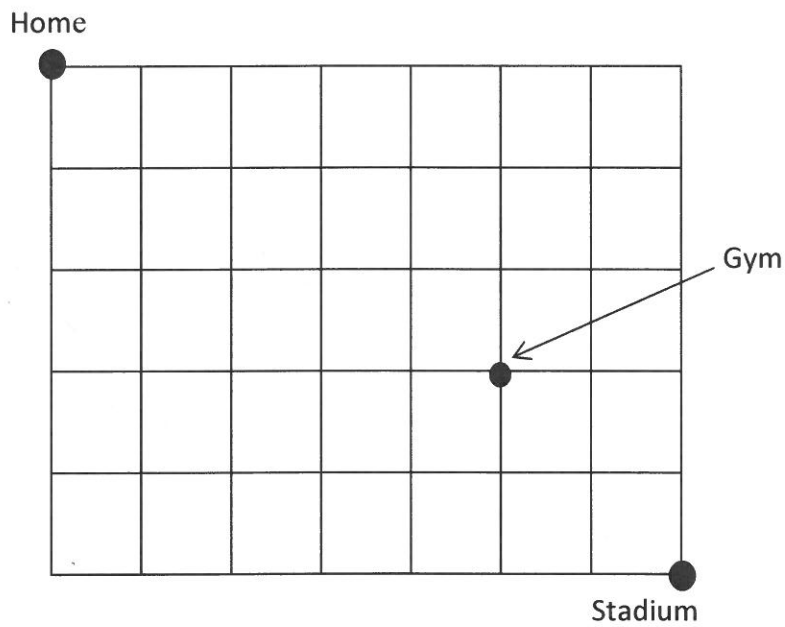
b) Consonants and vowels must alternate. (2 marks)

c) The first and second letters must be vowels. (2 marks)

15. a) Determine how many routes are Giorgi can travel from his home to the stadium if he can only travel South or East. (2 marks)



- b) Determine how many ways can Giorgi travel from home to the stadium if he must stop at the gym on the way and can only travel South or East? (3 marks)



7. The members of a math club consist of five women and six men. They would like to choose three of its members to attend a conference. Determine the number of ways can this be done if:

a) There must be two women and one man attending the conference. (1 mark)

b) There must be at least one women attending the conference. (2 marks)

c) All three people attending the conference must be the same sex. (2 marks)

8. Find and simplify the third term in the expansion of  $(2x - 3y)^8$ . (3 marks)

9. Identify and simplify the term containing  $x^{36}$  in the expansion of  $\left(x^4 - \frac{2}{x}\right)^{14}$ . (4 marks)