Name: _____

Foundations 12:
Permutations and Combinations Quiz

$${}_nP_r = \frac{n!}{(n-r)!} \qquad {}_nC_r = \frac{n!}{(n-r)!\,r!}$$

$$n! = (n)(n-1)(n-2)\ldots(3)(2)(1)$$

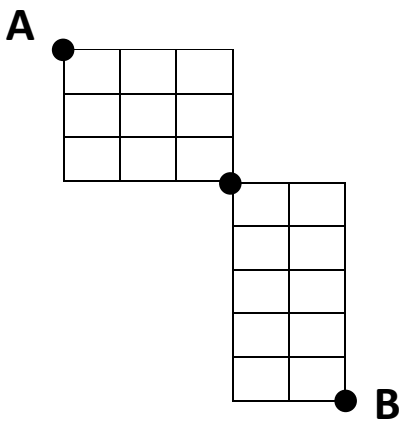
Full credit will only be awarded for all work shown in a neat and organized manner.

1. How many different arrangements can be made using all the letters of each word?
   a. CHAPTER b. TABLETOP c. PARALLEL

2. Mr. Gustainis has made a multiple-choice test with 11 questions. Each question can be answered A, B, C, or D. How many different ways could you fill out the test (no blanks) if:
   a. no restrictions?

   b. Mr. G tells you there are 3 A's, 4 B's, 1 C's and the rest D's in the correct answer?

3. How many pathways are possible from A to B if the paths must always move closer to B?



4. How many 6-card hands contain:
    a. 3 red cards and 3 spades?
    b. exactly 2 Jacks but no aces?
    c. at most 2 Kings?
    d. at least 4 Diamonds?

5. Mr. G is putting together a Physics Olympics team of 10 students. There are 13 grade 11s and 8 grade 12s that want to compete. How many different ways could he select his team if:
    a. there is an equal number of grade 11s and grade 12s on the team?
    b. Eugene (grade 11) and exactly 2 other grade 11s are on the team?
    c. At least 2 grade 11s are on the team (*Solve using the complement for full marks*)?