GRADE 12 APPLIED
DISTINGUISHABLE ARRANGEMENTS

Name: _____
Date: _____

Show work!

Distinguishable arrangements of n objects $= \frac{n!}{a!b!c!\ldots}$

Where a, b, c are the number of repetitions of each different object

1. Here is a word comprising all different letters: SKYE. How many ways can I arrange all the letters in that word to make other 'words'?

2. Here is a word with two letters the same: RUBBLE. How many 'distinguishable' ways can we re-arrange all those letters to make other words?

3. Here is a word with several repeated letters: ABRACADABRA. How many distinguishable ways can we arrange all those letters to make a new 'word'?

4. Here are some instructions to get from A to B in the city. "You go EAST, EAST, SOUTH, SOUTH, EAST (*ie*: EESSE) at each intersection"! How many ways can you distinguishably re-arrange these instructions?

5. **Pathways Revisited**. Using the idea from question 4 above, how many different routes can you take to get from A to B?

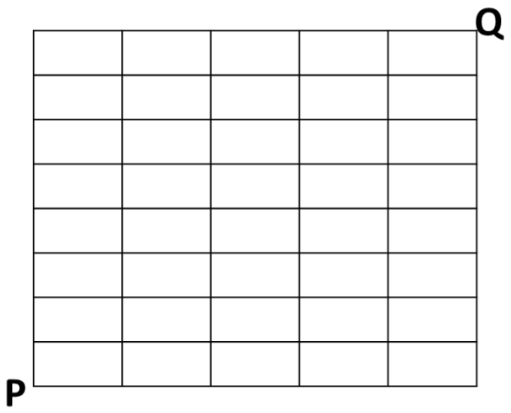
6. To get from P to Q using only North and East steps:

a. How many total steps (decisions) do you need to take?

b. How many steps must be to the EAST?

c. How many steps must be to the NORTH?

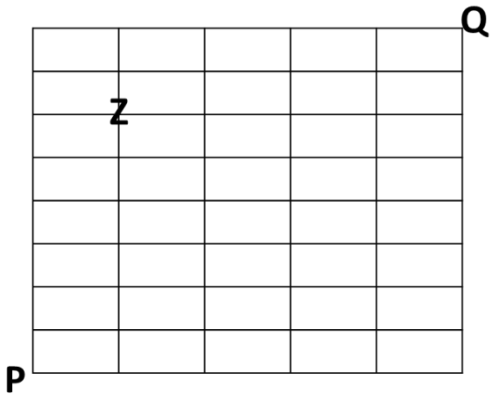
d. How many paths from P to Q using a distinguishable arrangement of instructions?



e. How many paths from P to Q using the PASCAL triangle method of adding up the intersections?

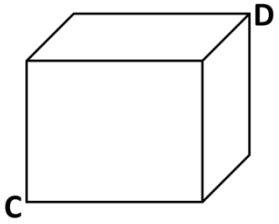
7. If you continually advance from P to Q, calculate:

a) number of paths from P to Z:
b) number of paths from Z to Q:
c) a) above times b) above:
d) total number of paths from P to Q:
e) Probability that on any random route from P to Q that you pass through Z?



f) Use the PASCAL triangle method of adding up successive corners to compare your answer for the routes from P to Q that pass through Z

8. How many paths (routes) can a bug take to get from C to D if it must follow an edge of this cube?



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