**Unit 8 #6 Permutations & Combinations**

**PERMUTATIONS**

A permutation is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of items in a particular \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Notice, order \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

To find the number of Permutations of n items, we can use the Fundamental Counting Principle or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_.

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| \*In your calculators:   1. \_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_ 3. \_\_\_\_\_\_\_ | To find the number of Permutations of n items chosen r at a time, you can use the formula:  nPr = , where |
| EXAMPLE  5P3 = | |

Example 1: A combination lock will open when the right choice of three numbers (from 1 to 30, inclusive) is selected. How many different lock combinations are possible assuming no number is repeated?

Example 2: From a club of 24 members, a President, Vice President, Secretary, Treasurer and Historian are to be elected. In how many ways can the offices be filled?

**COMBINATION**

A combination is an arrangement of items in which order does not matter. Order \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ matter!

Since the order does not matter in combinations, there are fewer combinations than permutations.  The combinations are a "subset" of the permutations.

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| \*In your calculators:   1. \_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_ 3. \_\_\_\_\_\_\_ | To find the number of Combinations of n items chosen r at a time, you can use the formula  nCr = , where |
| EXAMPLE  5C3 = | |

Example 3: To play a particular card game, each player is dealt five cards from a standard deck of 52 cards. How many different hands are possible?

Example 4: A student must answer 3 out of 5 essay questions on a test. In how many different ways can the student select the questions?

Practice Problem 1: How many ways can we pick a first and second favorite from a collection of 23 CD's?

Step 1: Does order matter? Yes / No Permutation / Combination

Step 2: How many to choose from? \_\_\_\_\_\_\_ How many are being picked? \_\_\_\_\_\_\_

Step 3: Fill in correct formula and solve.

Practice Problem 2: A coach must choose five starters from a team of 12 players.  How many different ways can the coach choose the starters?

Step 1: Does order matter? Yes / No Permutation / Combination

Step 2: How many to choose from? \_\_\_\_\_\_\_ How many are being picked? \_\_\_\_\_\_\_

Step 3: Fill in correct formula and solve.

Practice Problem 3: In how many ways can the 4 infield positions of a baseball team be filled, if there are 13 possible players for the positions?