FST Name _____

6-4 Counting Strings without Replacement Date _____ **A#7**

Goal: Use the Multiplication Counting Principle with replacement

Warm Up: A factorial, $n!$, is a product of an integer and all the lower ones until 1. For example, $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$. Evaluate each of the following.

a. 1!
b. 2!
c. 3!
d. 6!
e. 10!
f. $\frac{2010!}{2009!}$
g. $\frac{12!}{3!9!}$

Questions

Permutations

Example 1: Imagine that you have 10 books and you would like to read 3 of them this summer. How many different ways can you read the books?

Example 2: How many different can you select 4 cards from a deck of standard cards if you do not replace the cards?

An arrangement of teams, objects or symbols without replacement is called a _____ of those objects. The number of _____ of *r* objects taken from a group with *n* distinct objects is denoted by ${}_nP_r$. Below are two formulas to evaluate.

$${}_nP_r = \underbrace{n(n-1)(n-2)\ldots}_{r} \qquad \text{or} \qquad {}_nP_r = \frac{n!}{(n-r)!}$$

Example 3: How many different six-letter strings can be formed from six letters in the word PALINDROME without replacement?

Questions	

Example 4: In the Swenson National Art Museum, there are 12 Renaissance painters but only enough room to show 8 of them. In how many ways can the paintings be arranged on the walls?

Example 5: Evaluate ${}_{11}P_5$. Describe a scenario that would fit.

Example 6: Evaluate ${}_{24}P_6$. Describe a scenario that would fit.

Example 7: Solve ${}_nP_6 = 17 \cdot {}_nP_5$.

Example 8: Solve ${}_nP_5 = 20 \cdot {}_nP_3$.

Two More Things

${}_nP_n =$ _____

$0! =$ _____

Summary: