HW13 Counting Principles **Name_____ Hr____**

I will be able to use Counting Principles to answer "how many?"

Example Problems

A. How many ways are there to arrange the letter of the word *SUMMER*, if you use each letter exactly once?

B. How many ways are there to arrange 5 different paintings on a wall?

FACTORIAL: n! means n x (n-1) x (n -2) x ….2 x 1

1. In how many ways can the batting order of a 9-person baseball team be set? _____

2. In how many ways can Bruno Mars arrange a tour of 12 cities?_____

3. You work at a museum must arrange 20 paintings in a line along a wall. In how many ways can this be done? _____

4. A parade is going to have 16 different groups marching. In how many different ways can these groups be arranged?_____

5. At Mount Rushmore, the faces of four presidents are carved into the mountain. As you look at the monument, from left to right, the presidents are Washington, Jefferson, Roosevelt, and Lincoln. How many **other** ways could sculptor Gutzon Borglum have arranged the faces?

FACTORIAL OPERATIONS: Expand the factorials!

6. What is the shorter way to write the expression: 12*11*10*9*8*7*6*5?

7. Evaluate $\frac{10000!}{9998!}$ without a calculator _____

8. Evaluate $\frac{10!}{2^{10}}$

9. What is 4! + 5!

10. True or False $\frac{10!}{10} = 1!$

Simplify the following.

11. $\frac{10!}{(10-1)!}$ = _____

12. $\frac{10!}{(10-2)!}$ = _____

13. $\frac{10!}{(10-3)!}$ = _____

True False Questions. <u>Justify</u> your answer.

14. 5! – 3! = 2!

15. 6 * 5! = 6!

16. (6 – 3)! = 6! – 3!

17. $\frac{6!}{3!} = 2!$

18. How many different ID cards can be made if there are six digits on the card and no digit can be used more than once? _____
(assuming you get to use numbers 0 – 9)

19. Suppose 8 horses are in a race. How many different **first** and **second** place finishes can there be?_____