Permutations - order matters (is it being picked for a specific place?)
Combination - order doesn't matter

Day 3

Advanced Functions and Modeling   Name: hey
Permutations and Combinations   Date:_____Period:____

In ex. 1 - 7, tell whether permutations (ordered) or combinations (unordered) are being described.

1. A/president, vice-president, and secretary are chosen from a 25-member garden club. permutation
   order

2. A cook chooses 5 potatoes from a bag of 12 potatoes to make a potato salad. Combination

3. A teacher makes a seating chart for 22 students in a classroom with 30 desks. permutation

4. 13 cards are selected from a deck of 52 to form a bridge hand. Combination

5. 7 digits are selected (without repetition) to form a telephone number. Permutation

6. 4 students are selected from the senior class to form a committee to advise the cafeteria director about food. Combination

7. 4 actors are chosen to play the Beatles in a film biography. Permutation

In ex. 8 - 11, count the number of ways that each procedure can be done.

ordered

8. Line up three people for a photograph. $3 \times 2 \times 1 = 6$ $P(3,3)$
9. Prioritize four pending jobs from most to least important. $4 \times 3 \times 2 \times 1 = 24$ $P(4,4)$
10. Arrange five books from left to right on a bookshelf. $5 \times 4 \times 3 \times 2 \times 1 = 120$ $P(5,5)$
11. Award ribbons for 1st place to 5th place to the top five dogs in a dog show. $5 \times 4 \times 3 \times 2 \times 1 = 120$ $P(5,5)$

Answer the following.

12. How many 9-letter "words" (not necessarily in any dictionary) can be formed from the letters of the word LOGARITHM? (Curiously, one such arrangement spells another work related to mathematics. Can you name it?) $P(9,9) = 9! = 362,880$

13. The 13 members of the East Brainerd Garden Club are electing a president, vice-president, and secretary from among their members. How many different ways can this be done? $P(13,3) = 13 \times 12 \times 11 = 1716$

14. From among 12 projects under consideration, the mayor must put together a prioritized (that is, ordered) list of 6 projects to submit to the city council for funding. How many such lists can be formed?
$P(12,6) = 12 \times 11 \times 10 \times 9 \times 8 \times 7 = 665,280$

(15.) order doesn't matter
In the original version of poker known as "straight" poker, a five-card hand is dealt from a standard deck of 52. How many different straight poker hands are possible? $C(52, 5) = \frac{52!}{5!(52-5)!}$

(16.) Juan has money to buy only three of the 48 compact discs available. How many different sets of discs can he purchase? $C(48, 3) = \frac{48!}{3!(48-3)!}$

17. The head of the personnel department interviews eight people for three identical openings. How many different groups of three can be employed? $C(8, 3) = \frac{8!}{3!(8-3)!}$

18. Professor Indiana Jones gives his class 20 study questions, from which he will select 8 to be answered on the final exam. How many ways can he select the questions? $C(20, 8) = \frac{20!}{8!(20-8)!}$