Practice Combinatorics

Name:_____ Date:_____

1. You are choosing 4 other classmates to join your dodgeball team. If there are 9 students to choose from, how many possible teams can you form?

2. You are trying to crack a password that contains 3 letters. How many possible combinations are there?

3. You and your 5 friends are waiting for ice-cream. How many ways can you form a line?

4. You are creating a 4-letter code using the letters A, B, C, D, and E. How many different codes can you create if repetition of letters is not allowed and the order of the letters in the code matters?

5. You are creating a 4-digit PIN code for your smartphone. Each digit in the PIN code can be any number from 0 to 9, and repetition of digits is allowed. How many different PIN codes can you create?

6. You are choosing 4 colors from 7 to create. How many ways can you do this if the order of the colors does not matter and repetition is allowed?

Answer:

1. **126**

   Unordered and no repetition. Since order does not matter and repetition is not allowed, we are going to use n Choose k.

$9!/(4!(5!)) = 126$

2. **17576**

   Ordered and repetition allowed. We are going to use n^k

   $26^3 = 17576$

3. **720**

   Ordered and no repetition. We are going to use n!/(n-k)!. Notice that we are choosing where 5 girls will go, since the last one has a predetermined position.

   $6!/(6-5)! = 720$

4. **120**

   Ordered and repetition allowed. We are going to use n!/(n-k)!

   $5!/(5-4)! = 120$

5. **10000**

Ordered and repetition allowed. We are going to use n^k

$10^4 = 10000$

6. 210

Unordered and repetition allowed. We are going to use $(n + k - 1)Ck$

$(7 + 4 - 1)c4 = 10!/(4!(6!)) = 210$