Lesson Notes 2-3

Permutations of Distinguishable Objects

The number of permutations of n different objects taken r at a time is:  $\int_{n}^{n} P_r = \frac{n!}{(n-r)!}$ 

**Example 1:** Matt has downloaded 10 new songs from an online music store. How many different 6-song play lists can be created from 10 songs?

Example 2: How many 8-song play lists could Matt in example 1 create?

**Example 3:** State the values of n for which each expression is defined.

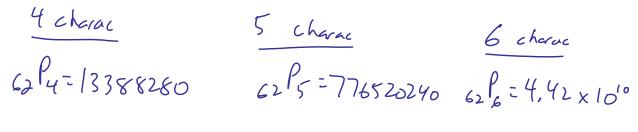
a) 
$$(n+3)!$$
  $n+3>0$   
 $n>-3$   
 $n<2>0$   
 $n<2>0$   
 $n<2>0$   
 $n>-2$   
(b)  $\frac{n!}{(n+2)!}$   
 $n<2>0$   
 $n>-2$ 

**Example 4:** An online magazine requires each subscriber to have a password with exactly 8 characters. The password can use any digits from 0 to 9 and/or any letters of the alphabet. The password is case sensitive, so she can use both lower- and upper-case letters. How many different passwords are possible?  $26 \pm 26 \pm 10$ 

$$62 P_8 = 1.36 E14$$
  
 $1.36 \times 10^{14}$ 

=62

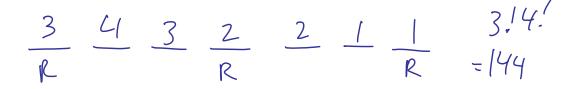
**Example 5:** How many different passwords are possible in example 4 if the password must be at least 4 characters but a maximum of 6 characters?



Total = 4.51 × 1010

**Example 6:** At a used car lot, seven different car models are to be parked close to the street for each viewing.

a) The three red cars must be parked so that there is a red car at each end and the third car is exactly in the middle. How many ways can the seven cars be parked?



b) The three red cars must be parked side by side. How many ways can the seven cars be parked?