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Quiz on Week 8
11.24.17

P(n, r) = n! / (n-r)! or

C(n,r) = n! / (r! * (n-r)!)

r-permutations with repetition allowed - n^r

r-combinations with repetition allowed - (n + r – 1)! / (r! * (n – 1)!)

1.
SUCCESSFUL = 10 letters total
S= 3 letters
U= 2 letters
C= 2 letters
E=1 Letter
F=1 Letter
L=1 Letter

P(10, 3) * P(7, 2) * P(5, 2) * P(3, 1) * P(2,1) * P(1,1)

=((10!)/(3!*2!*2!*1!*1!*1!)) = ANS

2.
IMPORTANCE = 10 letters total

a.
10! = ANS

b.
[IM]PORTANCE = 9 letters total
9! = ANS

c.
IMPORTANCE = 10 letters total, all letters are distinct = 10!
Consider[POR] as a single letter : IM[POR]TANCE = 8 letters total
Number of permutations with P,O,R together = 8!
So the number of permutations where POR do not come together is 10!-8! = ANS

3. Consider a bag of jelly beans that has 40 red, 40 yellow, and 40 green jelly beans.
Three different kinds of jelly beans = 3 containers = N
C(N+K-1, N)

a. How many color sequences can you get by drawing 6 beans from the bag?
With three containers of jellybeans = N and you are drawing 6 beans from the bag, you get 3^6 = ANS

b. How many color combinations of 10 beans have at most three yellow beans?
At most having 3 yellow beans is equal to 0 of 10, 1 of 10, 2 of 10, or 3 of 10. Thus:
C(40 + 3-1, 40) - C(10 + 3 - 1, 0) + C(10 + 3 -1, 1) + C(10, 2) + C(10, 3) = ANS

c. How many color combinations of 10 beans have at least seven yellow beans?
At least 7 yellow beans is equal to 7 of 10, 8 of 10, 9 of 10, or 10 of 10. Thus:
C(40 + 3-1, 40) - C(10, 7) + C(10, 8) + C(10, 9) + C(10, 10) = ANS

4.
C(N+K-1, N)
C(30 + 4 -1, 30) = C(33, 30)

5.
a.

C(8, 4) * C(6, 5)

=8!/(4!(8-4)! * 6!/(5!(6-5)! = ANS

b.

Choices of girls =
C(6, 1) * C(6, 2) * C(6, 3)

Choices of boys =
C(8, 5) * C(8, 4) * C(8, 3)

C(6, 1) * C(8, 5) +
C(6, 2) * C(8, 4) +
C(6, 3) * C(8, 3)

=6!/(1!(6-1)! * 8!/(5!(8-5)! +
6!/(2!(8-2)! * 8!/(4!(8-4)! +
6!/(3!(8-3)! * 8!/(3!(8-3)! = ANS