

Stat 2153 - Statistical Methods

Quiz #5 - 2008.03.06

Solutions

$${}_nP_r = \frac{n!}{(n-r)!} \quad {}_nC_r = \frac{n!}{(n-r)!r!}$$

For this quiz, you may leave your answer as ${}_nP_r$ or ${}_nC_r$, you do not actually have to compute them.

1. How many ways can you arrange 6 books on a shelf?

This is simply $6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 720$.

2. How many distinct ways can you arrange the letters in the word *southeastern*?

Notice that there are 12 letters total, out of which e, s and t are repeated twice. Therefore, we have the number of distinct ways to be

$$\frac{12!}{2!2!2!} = 79,833,600.$$

3. If there are 20 students in class today, how many different groups of 14 people can be made?

Since order does *not* matter here, we have a combinations problems:

$${}_{20}C_{14} = \frac{20!}{(20-14)!14!} = 38,760$$

4. If the only way to get an A, B, C and D on this quiz was to be the first, second, third and fourth person, respectively, to hand in the quiz, while the rest of the class failed, how many different ways could the A, B, C and D be awarded to four different students if we assume there are 20 students taking the quiz?

Here order *does* matter so we have a permutation problem:

$${}_{20}P_4 = \frac{20!}{(20-4)!} = 116,280$$