

STA 320 HW 2 Solution

1) Sample without replacement, order matters

$$\frac{n!}{(n-r)!} = \frac{16!}{(16-3)!} = \frac{16!}{13!} = 16 \cdot 15 \cdot 14 = 3360$$

2) Sample without replacement, order does not matter

$$\binom{19}{7} = \frac{19!}{(19-7)!7!} = \frac{19!}{12!7!} = 50388$$

3) # 4 letter words = $\frac{26!}{(26-4)!} = 26 \cdot 25 \cdot 24 \cdot 23 = 358800$

4 letter words with no vowels = $\frac{21!}{(21-4)!} = 18 \cdot 19 \cdot 20 \cdot 21$

$$= 143640$$

4 letter words with ≥ 1 vowel = # 4 letter words
- # 4 letter words with no vowels

$$= 358800 - 143640$$

$$= 215160$$

4) Selecting order of one sex determines the order of the other sex. Also, order does not matter. So, choose 3 positions out of 6 for sex 1

$$\binom{6}{3} = \frac{6!}{(6-3)!3!} = \frac{6!}{3!3!} = \frac{6 \cdot 5 \cdot 4}{3 \cdot 2} = 20 \text{ possible configurations.}$$

Only 2 configurations with alternating sex.

GBGBGB

BGBGBG

$$\text{So } P[\text{Event}] = \frac{2}{20} = \frac{1}{10}$$