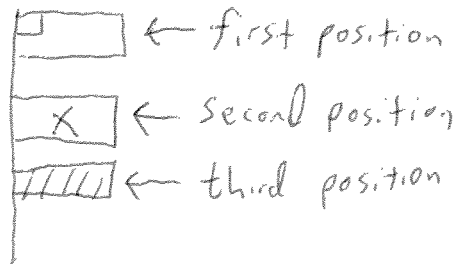


Probability + Statistics

Pre-Class Problems — Oct 26

1.2

2. Using multiplication principle:



$$(4)(3)(2) = 24$$

Annotations for the multiplication principle:

- 4 possibilities for the first position
- 3 possibilities for the second position
- 2 possibilities for the 3rd position

6. {FFFF, FF RF, FRFF, RFFF, FFRRF, FRFRF, RFFRF, FRRFF, RFRFF, RRFFF, RRR, RRFR, RFRR, FRRR, RRFFR, RFRFR, FRRFR, RFFRR, FRFRR, FFRRR}

= 20 possibilities

$$\begin{aligned} 8. \binom{n-1}{r} + \binom{n-1}{r-1} &= \frac{(n-1)!}{r!(n-1-r)!} + \frac{(n-1)!}{(r-1)!(n-r)!} \\ &= \frac{(n-r)(n-1)! + r(n-1)!}{r!(n-r)!} \\ &= \frac{n!}{r!(n-r)!} = \binom{n}{r} \end{aligned}$$

1.3

~~2.~~ 2. a) $\frac{1041}{1456}$ b) $\frac{392}{633}$ c) $\frac{649}{823}$

d) The proportion of women who favor a gun law is greater than the proportion of ~~all~~ men who favor a gun law.

4. a) $P(H, H) = \frac{13}{52} \cdot \frac{12}{51} = \frac{1}{17}$

b) $P(H, C) = \frac{13}{52} \cdot \frac{13}{51} = \frac{13}{204}$

c) Sum up each mutually exclusive probabilities

(i.e. the likelihood of drawing a non-ace heart followed by an ace and the likelihood of drawing the ace of hearts followed by a non-heart ace)

$$P(\text{non-ace heart, ace}) + P(\text{ace of hearts, non heart ace}) \\ = \frac{12}{52} \cdot \frac{4}{51} + \frac{1}{52} \cdot \frac{3}{51} = \frac{51}{52 \cdot 51} = \frac{1}{52}$$

6. a) $\frac{8}{14} \cdot \frac{7}{13} = \frac{56}{182}$

b) $\frac{6}{14} \cdot \frac{5}{13} = \frac{30}{182}$

c) $2 \left(\frac{8}{14} \cdot \frac{6}{13} \right) = \frac{96}{182}$ OR $1 - \left[\frac{56}{182} + \frac{30}{182} \right] = \frac{96}{182}$

↑
likelihood
of liking
both

↑
likelihood
of liking
neither