Joseph Spafford
A, Miller - Math 331
02/20/12
HW - 02/20.

21 A
22 A
23 A

Spoke with my roomate Clinton Clark,

02-20-21 $\binom{12}{2,3,7} = \binom{12}{x}\binom{y}{z}$

x and z must form denominators of 2, 3 or 7, while they can be replaced by 12 - themselves y needs to be the large value of x's 2 possible sum

there are $\binom{3}{2} \cdot 2^2$ total triples. $= 12$

OK but then are 40 or more?

02-20-22

a), $\dfrac{\binom{26}{13}}{\binom{52}{13}} = \dfrac{\frac{26!}{13!\,13!}}{\frac{52!}{13!\,39!}} = \dfrac{26! \cdot 39!}{52!\, 13!} \approx$

b.) Let: H be the event where I am void in Hearts
D be the event that my partner is void in diamonds.

$$P(H|D) = \frac{P(H \cap D)}{P(D)}$$

$$P(D) = \frac{\binom{39}{13}}{\binom{52}{13}}$$

Super!

$$P(H \cap D) = \frac{1}{\binom{52}{13}\binom{39}{13}} \cdot \sum_{n=0}^{13} \underbrace{\binom{13}{n}}_{\#\text{diamonds in my hand}} \binom{26}{13-x} \cdot \binom{26+x}{13}$$

$\leftarrow$ good

2-26-25.

The ~~two~~ probabilities are equal. The condition that you and your partner have all of a given suit implies that your opponents are void in that suit.

So allowing A = event that my team has all clubs

B = event that my team has no spades.

$$P(A) = \frac{\binom{39}{13}\binom{13}{13}}{\binom{52}{26}} = \frac{\frac{39!}{13!\,26!}}{\frac{52!}{26!\,26!}} = \frac{39!\,26!}{52!\cdot 13!}$$

$$P(B) = \frac{\binom{39}{26}}{\binom{52}{26}} = \frac{39!\,26!}{52!\cdot 13!} = P(A)$$