

NICK Prestine

Probability

#1 $\binom{15}{8} = \frac{15!}{8!(15-8)!} = 0.101237$

#2 $\frac{9 \cdot 9 \cdot 7 \cdot 6 \cdot 15}{10000} = \left(\frac{(3 \cdot 2 \cdot 7 \cdot 6 \cdot 5)^3}{100000} \cdot \left(\frac{8}{5} \right) \right)$
 $\approx 6.4 \times 10^{-6}$

#3

$P(A \cap B) = P(A) \cdot P(B) \Rightarrow A \text{ \& B are independent}$

$P(A) = P(X=2) + P(X=3) = 1/2$

$P(B) = \frac{1}{6^3} = \frac{1}{36}$

$P(A) \cdot P(B) = \frac{1}{2} \cdot \frac{1}{36} = \frac{1}{72}$

~~$P(A \cap B) = \frac{1}{72}$~~

$P(A \cap B) = \frac{1}{6^3} + \frac{1}{6^3} + \frac{1}{6^3} = \frac{1}{72}$

$P(A) \cdot P(B) = P(A \cap B) \checkmark$

$\frac{1}{72} = \frac{1}{72}$ Independent

#4

$$P(\text{flush on 5 card hand}) = \frac{\binom{13}{5} \cdot 4}{\binom{52}{5}} = 0.00198742$$

H = hands to get
flush

$H \sim \text{geometric}(p)$

$$\frac{1}{p} = \frac{1}{0.00198742} = E[H] \approx 504.85$$

5

#6

win2w

super plays = 5

no super = 2

$$P(W^{4/5}|2) = \binom{5}{4} (0.7)^4 (0.3) = 0.36015$$

$$P(W^{4/5}|2) = \binom{5}{4} (0.5)^4 = 0.15625$$

$$P(W^{4/5}) = P(W^{4/5}|2) \cdot P(2) + P(W^{4/5}|1) \cdot P(1)$$

$$P(2) \Rightarrow 0.36015(0.7) + 0.15625(0.25)$$

$$P(2|W^{4/5}) = \frac{0.309175}{0.36015(0.7) + 0.15625(0.25)}$$

$$\frac{P(2|W^{4/5})}{P(W^{4/5})} \rightarrow \frac{0.309175}{0.87327}$$