Probability Problems

1. 15 students, favorable events = 8 − 1 = 7

Probability = $\frac{7}{15}$ = **0.46**

2. Total # integers from 0–99999 = 10^5

In 0–100 = not possible

in 100–1000 = 100 digits

in 1000–10000 = 100

in 10000–99999 = 4200

Sum = 5000

$p = \frac{5000}{10^5} = 0.05$

$P_f = {}^8C_5 (0.05)^5 (1-0.05)^3$

$= {}^8C_5 (0.05)^5 (0.95)^3 \longrightarrow$ **1.5×10^{-5}**

3. Independent

Rolling 4 or above = $3/6 = \frac{1}{2}$

Rolling 3 of the same = $\frac{6}{6^3} = \frac{1}{36}$

$P(A \cap B) = 3/216 = \frac{1}{72}$

$P(A) \times P(B) = \frac{1}{72}$, thus independent

4. $P = \frac{4 \times ({}^{13}C_5)}{{}^{52}C_5} = 0.00198$

since each is a new deal, replacement

$= \frac{1}{P} = \frac{1}{0.00198} =$ **504.8486**

5. P(win, superstar) = .7 P(win, no superstar) = .5

0.75 for next 5 games.

P(win 4/5, super) = ${}^5C_4 \cdot 0.7^4 \cdot 0.3 = 0.3602$

P(win 4/5, no super) = ${}^5C_4 \cdot 0.5^5 = 0.15625$

$0.15625 \cdot 0.25 + 0.3602 \cdot 0.75 = 0.3092 \rightarrow \frac{0.3602 \cdot 0.75}{0.3092} =$ **0.8737**