

$$1. \frac{15}{15} \cdot \frac{14}{15} \cdot \frac{13}{15} \cdot \frac{12}{15} \cdot \frac{11}{15} \cdot \frac{10}{15} \cdot \frac{9}{15} \cdot \frac{8}{15} \\ = 0.1012$$

$$2. \text{ each number: } \frac{5}{10} \cdot \frac{4}{10} \cdot \frac{5}{10} \cdot \frac{7}{10} \cdot \frac{6}{10} = \frac{21}{500}$$

picking the even
digit first

$$\text{exactly 5: } \binom{8}{5} \cdot \left(\frac{21}{500}\right)^3 \left(\frac{479}{500}\right)^2 \\ = 0.003808$$

3. A: at least 2 show 4 or above
B: all 3 show same val

$$P(A) = {}_3C_2 \left(\frac{3}{6}\right)^2 \left(\frac{3}{6}\right)^1 + {}_3C_3 \left(\frac{3}{6}\right)^3 \\ = \frac{1}{2}$$

$$P(B) = \left(\frac{6}{6}\right) \left(\frac{1}{6}\right) \left(\frac{1}{6}\right) \\ = \frac{1}{36}$$

$$P(A|B) = \frac{1}{2} \quad (\text{rolling all 4, 5, 6})$$

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

all same,
2 are 4 or
more

$$P(A|B) = \frac{1}{2} = P(A) \quad \checkmark$$

$$P(A \cap B) = \frac{1}{72} = P(A) \cdot P(B) \quad \checkmark$$

$\therefore A$ and B
are independent

$$4. \text{ prob of flush: } \frac{13}{52} \cdot \frac{12}{51} \cdot \frac{11}{50} \cdot \frac{10}{49} \cdot \frac{9}{48} \cdot 4 = P(F)$$

$$E(x) = \frac{1}{P} = 504.8484$$

$$5. \quad p(s | w4) = \frac{p(s \cap w4)}{p(w4)} \quad \begin{array}{l} s: \text{superstar plays} \\ w4: \text{win 4 games} \end{array}$$

$$p(w4) = p(w4 | s) \cdot p(s) + p(w4 | !s) \cdot p(!s)$$

$$p(w4) = 5 \cdot \left(\frac{7}{10}\right)^4 \left(\frac{3}{10}\right) \cdot 0.75 + 5 \left(\frac{1}{2}\right)^4 \left(\frac{1}{2}\right) \cdot 0.25$$

$$= 0.3092$$

$$p(s \cap w4) = 0.75 \cdot 5 \left(\frac{7}{10}\right)^4 \left(\frac{3}{10}\right) = p(s) \cdot p(w4 | s)$$

$$= 0.27011$$

$$p(s | w4) = \frac{0.27011}{0.3092}$$

$$= 0.8736$$