

$$1. \frac{15!}{7!} / 15^8 = 0.1012 = 10.12\%$$

$$2. \text{random \#s} - (100000)^8$$

$$(5 \cdot 4 \cdot 7 \cdot 6 \cdot 5) - \text{actual \#} = \left(\frac{(5 \times 5 \times 4 \times 6 \times 7)}{100000} \right)^5 \times$$

$$\left(\frac{1 - 5 \times 5 \times 4 \times 6 \times 7}{100000} \right)^3 \left(\frac{8}{5} \right)$$

$$= 6.4 \times 10^{-6}$$

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

$$P(B) = 1 \left(\frac{1}{6}\right)^2 = \frac{1}{36}$$

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

$$P(A) P(B) = P(A \cap B);$$

$$P(A \cap B) = \frac{3}{6} \times \left(\frac{1}{6}\right)^2 = \frac{1}{72}$$

it is independent

$$4. 1 \times \frac{12}{51} \times \frac{11}{50} \times \frac{10}{49} \times \frac{9}{48} = \frac{11880}{31875200} = \frac{1}{2700} = 0.00037$$

5. when Superstar plays \rightarrow win 70%

when Superstar plays \rightarrow win 50%

$$P(\text{Superstar plays}) = 0.75$$

$$P(\text{win } 4/5 | \text{Superstar}) = \binom{5}{4} \times 0.7^4 \times 0.3 = 0.36015$$

$$P(\text{win } 4/5 | \text{Superstar does not play}) = \binom{5}{4} \times 0.5^5 = 0.15625$$

$$P(\text{win } 4/5) = 0.15625 \times 0.25 + 0.36015 \times 0.75 = 0.309175$$

$$P(\text{superstar plays } 1 \text{ win } 4/5) = 0.36015 \times 0.75 / 0.309175 = 0.8737$$

$$P(F|E) = \frac{P(E|F) \cdot P(F)}{P(E)}$$