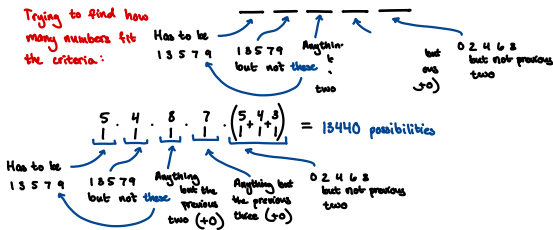


- $$\frac{15}{15} \cdot \frac{14}{15} \cdot \frac{13}{15} \cdot \frac{12}{15} \cdot \frac{11}{15} \cdot \frac{10}{15} \cdot \frac{9}{15} \cdot \frac{8}{15} = 10.12\%$$

- Trying to find how many numbers fit the criteria:



100000 numbers total

1	2	3	4	5	6	7	8
13440	13439	13438	13437	13436	13435	13434	13433
100000	99999	99998	99997	99996	99995	99994	99993

= 0.00001%

- $P(B) = \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}$  Any number but the rest have to match

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{\frac{3}{16} \cdot \frac{3}{16} \cdot \frac{1}{6} \cdot \frac{1}{6}}{\frac{1}{6} \cdot \frac{1}{6}} = \frac{3}{16} \cdot \frac{3}{16} = P(A)$$

A and B are independent  $\leftarrow P(A|B) = P(A)$

- $$P(X=5) = \frac{5148}{2\,598\,960}$$

$$\rightarrow E[X] = \frac{1}{p} = \frac{2\,598\,960}{5148} \approx 504 \text{ hands}$$

where  $X$  is the number of cards pulled from the same suit

2. A basketball team has a superstar. When their superstar plays, they win 70% of the time. When their superstar does not play they win 50% of the time. Entering a 5 game stretch, the superstar had been recovering from an injury and said the chance they would play the next 5 games was 75%. You go on a trip to the jungle (no internet access). When you return you find out the team won 4 of the 5 games. What is the probability the superstar played those 5 games? You may assume the superstar doesn't get injured during those games (either they play all or none of the 5).

Event S is the superstar playing

Event E is the team winning 4/5

Looking for  $P(S|E)$

$$P(S') = 1 - P(S) = 25\% = .25$$

$$P(S) = 75\% = .75$$

$$P(S|E) = \frac{P(E|S) \cdot P(S)}{P(E|S)P(S) + P(E|S')P(S')} = \frac{x(0.75)}{x(0.75) + y(0.25)} = \frac{0.36 \cdot 0.75}{0.36 \cdot 0.75 + 0.156 \cdot .25} \approx 0.87 \approx 87\%$$

$$P(E|S) = \frac{5}{4} \cdot (0.7)^4 \cdot 0.3 = 0.36$$

$$P(E|S') = \frac{5}{4} \cdot (0.5)^4 = 0.156$$