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1) 15 students

8 questions during 1 lect

Prob no student will have to ans > 1 prob?

$$P(E) = \frac{8-1}{15} = \frac{7}{15} = .46\overline{7} \quad 46\%$$

2) int range 00000 - 99999 uniform @ random

even int that start w/ 2 odd digits, whose digits are unique

random generate 8 nmbs, what prob 5 nums that meet our criteria?

0 - 100 : 0

100 - 1000 : 5·4·5 = 100

1000 - 10000 : 5·4·7·5 = 700

10000 - 99999 : 5·4·7·6·5 = 4200

} 5000 total req ints

$$P = \frac{5000}{99999} \approx .05 \quad \text{prob} = 5\% \text{ prob}$$

$$P(X=5) = \binom{8}{5}(.05)^5(1-.05)^3$$

$$P(x=5) \Rightarrow P = .0000156 = 1.5 \times 10^{-5}$$

3) roll 3 six sided fair Dice

A = event that 2 dice show 4

B = 3 dice show same value

Are A + B independent?

$$P(B) = \frac{6'}{6^3} \quad \text{num of dices} = \frac{1}{6^2} = \frac{1}{36}$$

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

$$P(A\cap B) = \frac{1}{6^3} + \frac{1}{6^3} + \frac{1}{6^3} = \frac{3}{216} = \frac{1}{72} \qquad P(A\cap B) = P(A) \times P(B)$$

$$P(A) \times P(B) = \frac{1}{2} \times \frac{1}{36} = \frac{1}{72} \qquad \therefore \; A + B \text{ are independent}$$

4) 5 cards suit
52 cards total

total hands: $\binom{52}{5} = 2,598,960$

total suits: $\binom{13}{5} = 1287$ = 5148

4 suits Royal: $\binom{4}{1} = 4$

$\frac{x}{=} = 4$

$\Rightarrow \frac{5148}{2,598,960} \approx .00198 = P$

$E(x) = \frac{1}{P} = \frac{1}{.00198} = 504.84 = \underline{505 \text{ hands}}$

5) Superstar plays
$P(\text{win}) = 70\%$

superstar doesn't play
$P(\text{win}) = 50\%$

chance superstar plays
$P(x \text{ plays}) = 75\%$

Team won $\frac{4}{5}$ games

\$ Superstar played during $4/5$

$= \binom{5}{4} \cdot (.70)^4 (.3) = .360$

superstar dosn't play $4/5$)

$\binom{5}{4} \cdot (.50)^4 (.50) = .156$

$= (.360)(.750) + (.156)(.250)$

$= .309$

$P(\text{superstar played those 5 games}) = \frac{(.360)(.75)}{(.309)}$

$= .873786 = \underline{87.38\%}$