

Probability.

1. 15 students

Subset / total set

$$\frac{15}{15} + \frac{14}{15} + \frac{13}{15} + \frac{12}{15} + \frac{11}{15}$$


1 2 3 4 5

$$+ \frac{10}{15} + \frac{9}{15} + \frac{8}{15} = \boxed{0.1011}$$

6 7 8

2. odd odd

even

		↓	↓	↓
1	3	2	7	0
3	5	4	9	2
5	7	6	2	4
7	9	8	4	6
9		5	6	8
		7	8	
		9		

$$5 \times 4 \times 7 \times 6 \times 5$$

$$= \boxed{4200}$$

3. 3 dice

A: 2 dice ≥ 4

B: All 3 same

A: Binomial Distribution $P(k) = \binom{n}{k} p^k (1-p)^{n-k}$

$$P(A_1) = \binom{3}{2} \left(\frac{1}{2}\right)^2 \left(\frac{1}{2}\right) = 3/8$$

$$P(A_2) = \binom{3}{2} \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right)^0 = 1/8$$

$$P(A) = \frac{3}{8} + \frac{1}{8} = 1/2$$

B:

$$P(B) = \frac{6}{6} \times \frac{1}{6} \times \frac{1}{6} = 1/36$$

$$P(A \cap B) = \frac{3}{6 \cdot 6 \cdot 6} = 1/72$$

$$\frac{1}{2} \cdot \frac{1}{36} = 1/72$$

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

\therefore Independent

4. FLUSH

possible #'s

$$\binom{13}{5}$$

possible suits

$$\binom{4}{1}$$

$$\frac{\binom{13}{5} \binom{4}{1}}{\binom{52}{5}}$$

combo
of
cards \rightarrow

$$= 1.98 \times 10^{-3}$$

$$\frac{1}{1.98 \times 10^{-3}} =$$

505.05
hands

5. superstar 70% win

!superstar 50% win

E = event team wins 4/5 games

F = event superstar played

F^c = event superstar didn't play

$$P(F) = 3/4$$

$$P(F^c) = 1 - P(F) = 1/4$$

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

$$P(E|F)P(F) + P(E|F^c)P(F^c)$$

$$\binom{n}{k} p^k (1-p)^{n-k}$$

$$P(E|F) = \binom{5}{4} (0.7)^4 (0.3)^1 = 0.36015$$

$P(E|F^c)$ = 4/5 wins no star player

$$\binom{n}{k} p^k (1-p)^{n-k}$$

$$\binom{5}{4} (0.5)^4 (0.5)^1 = 0.15625$$

$$\rightarrow \frac{0.36015(0.75)}{0.36015(0.75) + 0.15625(0.25)}$$

$$0.36015(0.75) + 0.15625(0.25)$$

$$= \boxed{87\%}$$