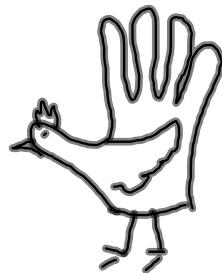


(2) 1. What does n^r represent?

(2) 2. What does $\binom{n}{r}$ represent?

(6) 3. Draw a hand turkey.



Probability

sample space

event

Probability of an event:
S: sample space

$$P(E) = \frac{\# \text{ of outcomes in } E}{\# \text{ of outcomes in } S}$$

Axioms of probability

S: sample space

P: set of all events of S $\rightarrow \mathbb{R}$
 $\mathcal{P}(S) \rightarrow \mathbb{R}$

$\forall A, B \subseteq S$

1. $0 \leq P(A) \leq 1$

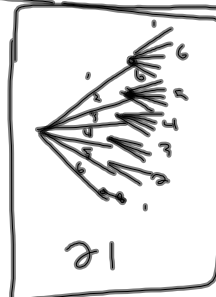
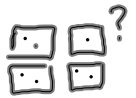
2. $P(\emptyset) = 0$

$P(S) = 1$

3. If $A \cap B = \emptyset$

then $P(A \cup B) = P(A) + P(B)$

2 Dice



Sample space
size = 36

$$P(\{1, 2\}) = \frac{2}{36}$$

P rolling $\{1, 2\}$ or $\{3, 4\}$
 $\frac{2}{36} + \frac{2}{36}$

$$P(A^c) = 1 - P(A)$$

A, B events

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Deck of cards: draw a card

prob. of drawing a red card or a face card

A: red card
B: face card

$$P(A) = \frac{26}{52}$$

$$P(B) = \frac{12}{52}$$

$$P(A \cap B) = \frac{6}{52}$$

$$P(A \cup B) = \frac{26}{52} + \frac{12}{52} - \frac{6}{52} = \frac{32}{52}$$

Expected outcomes have values:

$$a_1, a_2, a_3, \dots, a_n$$

which occur w/ prob. $p_1, p_2, p_3, \dots, p_n$

expected value

$$\sum_{k=1}^n a_k p_k$$

Roulette: 0, 00, 1-36 outcomes

\$1 Bet on a single #: x

$$P(x) = \frac{1}{38} \quad \text{payout: 35 to 1}$$

win \rightarrow (35-1) \leftarrow pay

$$\frac{1}{38} \cdot 34 + \frac{37}{38} (-1)$$

$$\frac{34}{38} - \frac{37}{38} = -\frac{3}{38}$$