



Probability

Geometry

5/9/16

ESSENTIAL QUESTION:

What are the key terms in probability?

QUESTIONS:

NOTES:

Probability: the chance something ^{will} happen. In math, it's a ratio, fraction, or percent of part of a group compared to the ^{to the} whole.

Experiment: any activity or situation where there is uncertainty about which of 2 or more outcomes will result.

Sample space: the set of all possible outcomes

Examples of sample spaces:

If I flip a coin:

$$S = \{H, T\}$$

If I roll a six-sided dice:

$$S = \{1, 2, 3, 4, 5, 6\}$$

Rules for probability:

1. Probability of each outcome must be between 0 and 1
2. The probabilities of all outcomes in a sample space add up to 1

An event is a specific set of outcomes in a sample space

Examples of calculating the probability of an event:

$$P(\text{event}) = \frac{\# \text{ of desired outcomes}}{\# \text{ of possible outcomes}}$$

$$E = \{2, 4, 6\}$$

$$P(E) = \frac{3}{6} = \frac{1}{2} = .5 = 50\%$$

Independent and dependent events:

Events are independent if: For events A and B, $P(A \text{ and } B) = P(A) \cdot P(B)$

If they are not independent, events are dependent.

Example

If the $P(A) = .3$ and $P(B) = .4$ and the events of A+B are independent

then ~~$P(A \text{ and } B)$~~ $P(A \text{ and } B) = (.3)(.4) = .12$

SUMMARY:

NOTES:

$$P = \frac{\# \text{ of desired outcomes}}{\# \text{ of possible outcomes}}$$

Dice sum table:

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Probability using dice:

$$P(\text{sum of 6}) = \frac{5}{36}$$

$$P(\text{odd number}) = \frac{18}{36} = \frac{9}{18} = \frac{1}{2}$$

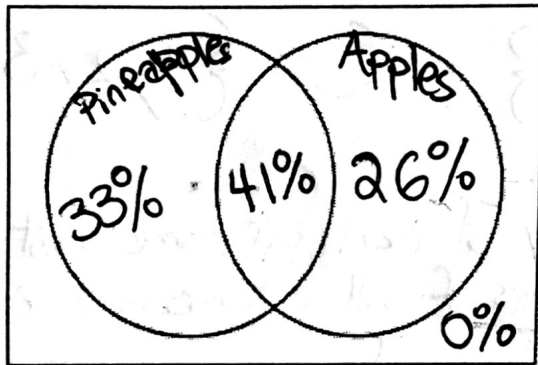
$$P(9 \text{ or } 3) = \frac{4+2}{36} = \frac{6}{36} = \frac{1}{6}$$

$$P(\text{greater than 8}) = \frac{10}{36} = \frac{5}{18}$$

$$P(\text{no more than 5}) = \frac{10}{36} = \frac{5}{18}$$

A Venn Diagram is a diagram representing a math or logic set
 It uses circles to represent events and a rectangle to represent all the possible outcomes.

Example:



33% = likes pineapple

26% = likes apples

41% = both

$$\text{Pineapples} \cup \text{Apples} = 100\%$$

$$\text{Pineapples} \cap \text{Apples} = 41\%$$

A union is when an outcome belongs to one or another set, Symbol: \cup

An intersection is when an outcome belongs to both sets - Symbol: \cap

Addition rule: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Example: What's the probability of pulling a face card or club card?

13 club cards; 12 Face cards; 3 are both club cards

$$P(\text{club or face}) = \frac{13}{52} + \frac{12}{52} - \frac{3}{52} = \frac{22}{52} = \frac{11}{26}$$