L24- Conditional Probability

Conditional Probability $P(B|A) = \frac{P(A \cap B)}{P(A)}$ or $P(A|B) = \frac{P(A \cap B)}{P(B)}$

Multiplication Rule $P(B|A) \times P(A) = P(A \cap B)$

Bayes Theorem $P(B|A) = \frac{P(A|B) \times P(B)}{P(A)}$

Total Probability Rule

$$P(A) = P(A \cap B) + P(A \cap B')$$
$$= P(A|B) \cdot P(B) + P(A|B') \cdot P(B')$$

Independence

A and B are independent if ex. coin flip

$$P(A|B) = P(A)$$

* if two events are mutually exclusive, they are not independent

- Venn Diagrams
- Tree diagram problems
  - Sex vs. IOCT tab
  - Sex and norovirus
  - HIV+ and Tests

3 ways to answer these problems

1. Tree diagrams ★★★
2. Venn diagram
3. Tables (2 way)
4. Raw equations