

Vocabulary Review Sheet

Lesson – Compound Probability and Overlapping Inequities

How to Use

- Review each term and example before your quiz.
- Connect **math definitions** to **real situations about stacked barriers and fairness**.
- Keep this sheet in your *Equity in Numbers Student Journal*.
- Remember: *Probability helps us see how different barriers connect — and how equity solutions can connect too.*

Compound Probability

- **Definition:** The probability of two or more events happening together or in combination.
- **Math Example:** $P(L \text{ and } H) = 0.26 \rightarrow 26\%$.
- **Real-Life Example:** A resident experiences both low income and limited health access.
- **Fairness Example:** Shows how barriers can stack on top of each other, increasing inequity.

Intersection (n)

- **Definition:** The probability that two events happen at the same time.
- **Math Example:** $P(L \cap H) = 0.26$.
- **Real-Life Example:** People who have both low income *and* limited healthcare access.
- **Fairness Example:** The intersection shows where needs overlap and support must be targeted.

Union (U)

- **Definition:** The probability that at least one of two events occurs.
- **Formula:** $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.
- **Math Example:** $P(L \cup H) = 0.45 + 0.38 - 0.26 = 0.57$ (57%).
- **Real-Life Example:** People who have either low income *or* limited health access (or both).
- **Fairness Example:** The union shows how many people need at least one kind of support.

Complement (A^c)

- **Definition:** The event that the original event does *not* happen.
- **Formula:** $P(A^c) = 1 - P(A)$.
- **Math Example:** If $P(L \cup H) = 0.57$, then $P(\text{neither}) = 0.43$.
- **Real-Life Example:** Residents who do *not* face either barrier.
- **Fairness Example:** Shows who already has resources — useful for comparing conditions.

Conditional Probability

- **Definition:** The probability of one event occurring given that another has already occurred.
- **Formula:** $P(A | B) = P(A \cap B) \div P(B)$.
- **Math Example:** $P(H | L) = 0.26 \div 0.45 = 0.58$ (58%).
- **Real-Life Example:** 58% of low-income residents also have limited healthcare access.
- **Fairness Example:** Shows how one inequity increases the likelihood of another.

Independence

- **Definition:** Two events are independent if the probability of one does not change when the other happens.

- **Math Check:** Compare $P(A | B)$ to $P(A)$. If they're equal, events are independent.
- **Math Example:** $P(H) = 0.38$ vs $P(H | L) = 0.58 \rightarrow$ Not independent.
- **Real-Life Example:** Low income *does* affect access to healthcare.
- **Fairness Example:** Non-independence shows structural connections between barriers.

Dependent Events

- **Definition:** Events where one outcome affects the other.
- **Math Example:** $P(H | L) \neq P(H)$.
- **Real-Life Example:** If having low income increases the chance of limited healthcare, the events are dependent.
- **Fairness Example:** Dependence shows how systemic issues link across areas like income and transportation.

At Least One

- **Definition:** The probability that one or more events happen.
- **Formula:** $P(\text{At Least One}) = 1 - P(\text{None})$.
- **Math Example:** If $P(\text{neither}) = 0.43$, then $P(\text{At Least One}) = 0.57$.
- **Real-Life Example:** 57% of residents face one or more barriers.
- **Fairness Example:** Quantifies the proportion of the community needing some type of support.

Exactly Two Events

- **Definition:** When a person experiences two out of three possible events.
- **Math Example:** $P(\text{Exactly 2 Barriers}) = \text{Sum of each two-way intersection} - 2 \times (\text{three-way overlap})$.
- **Real-Life Example:** Residents who struggle with income and transportation, but have health access.

- **Fairness Example:** Helps target interventions for people facing multiple barriers simultaneously.

Overlapping Inequities

- **Definition:** When two or more social barriers affect the same individuals or communities.
- **Math Example:** $P(L \cap H) = 26\%$ overlap between income and health barriers.
- **Real-Life Example:** Families who both lack transportation and health coverage.
- **Fairness Example:** Overlaps reveal how systems of inequality interact — and where change is most needed.

Interpretation

- **Definition:** Explaining what probability results mean in real contexts.
- **Math Example:** “57% of residents face at least one barrier — nearly 3 in 5 people.”
- **Real-Life Example:** Data helps policy leaders prioritize resources for high-barrier communities.
- **Fairness Example:** Interpretation transforms numbers into stories of advocacy and solutions.

Summary of Math + Fairness Connections

Concept	Math Focus	Fairness Connection
Intersection (n)	Both events occur	Shows stacked barriers
Union (U)	At least one event	Reveals who needs any support
Complement (A^c)	Neither event occurs	Identifies those without barriers
Conditional Probability	Given that one happened	Measures linked inequities
Independence	Compare $P(A$	$B)$ vs $P(A)$

Concept	Math Focus	Fairness Connection
Overlapping Inequities	Multiple events at once	Defines where change is most urgent