**Probability Flow Chart!**

**AP Statistics – Chapter 5**

**Multiplication Counting Principle:**

If one event can occur in **a** number of ways and another event can occur in **b** number of ways, both events will occur in **a∙b** number of ways.

How do I answer a probability question???

**YES**

Is the question referring to a **Simple Event?**

(Single Event)

**How do I find # of outcomes?**

Are the events **Independent** from each other? (Does one event *not* rely on the occurrence of another?)

P(A | B) = P(A ∩ B)

P(B)

P(A) = number of outcomes in A = n(A)

total number of outcomes n(S)

Is the question referring to **Compound Events**?

(More than 1 event)

* **OR**
* **AND/BOTH**
* **“At least one”**
* **GIVEN**

**NO**

**YES (Mutually Exclusive)**

Are the events **Mutually Exclusive/Disjoint**? (Do the events have NO common outcomes?)

P(A ∪ B) = P(A) + P (B)

**NO (Overlapping)**

P(A ∪ B) = P(A) + P (B) – P(A ∩ B)

**OR**

P(A ∩ B) = P(A) **∙** P (B)

**YES (Independent)**

**AND/BOTH**

P(A ∩ B) = P(A) **∙** P (B | A)

**NO (Dependent)**

**Don’t Know?**

If P(B) = P(B|A), events A and B are **Independent**.

**“At least one”**

If P(B) ≠ P(B|A), events A and B are **Dependent**.

**GIVEN**

P(at least one event occurring) = 1 – P(event never occurring)

General Rules that ALWAYS Apply: P(A ∪ B) = P(A ***or*** B)

S = Sample Space P(S) = 1 (The sum of probabilities in the Sample Space is 1) P(A ∩ B) = P(A ***and*** B)

A = outcomes of some event 0 ≤ P(A) ≤ 1 P(A | B) = P(A ***given*** B)

Ac = outcomes not in A (complement) P(Ac) = 1 – P(A) P(A ∩ B) = P(B ∩ A)