**Unit 2: The Bullet Points**

**Fundamental Counting Principle (FCP)** – selecting one from each group; multiply the number of options within each group

 Ex. Choosing classes, picking out an outfit, phone numbers, burgers…

**Combination** – selecting multiple from a group when the order doesn’t matter nCr

 Ex. Electing members to a committee, picking movies from a list, calling a group of kids

**Permutation** – selecting multiple from a group when the order does matter nPr

 Ex. Electing a president and secretary, finishing a race, standing in line, picking order

**Repetition** – Arranging a group when values / items repeat

 Ex. Rearranging letters in a word, arranging silverware / candles / lights

**Circular** – Arrangement in a circle with no reference point

 Ex. Standing around a campfire, sitting around a table (reference points make it linear)

**Probability** - Success what we want to happen

 Total what could happen

**Conditional** – finding probability when a piece of information about the outcome(s) is given; divide the probability of both events by the probability of the given event

 Ex. What is the probability that a random card is a club, given that it is black?

**Multiple Events** – probability of one event followed by another (usually has a THEN / AND), multiply the probability for each event

 **Independent** – first event doesn’t affect later events

 Ex. Flipping a coin, selecting a card then replacing

 **Dependent** – first event affects the next event

 Ex. Selecting cards without replacing

 \*If order does not matter combinations can sometimes simplify the work\*

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**Multiple Outcomes** – probability of one event has multiple criteria for success (usually has OR), add the probability for each possible outcome

 **Inclusive** – sets of outcomes that have overlapping values (need to subtract the overlap)

 Ex. Rolling an even number or greater than a 3

 **Exclusive** – sets of outcomes that do not have overlapping values

 Ex. Rolling an even number or a 5

**Expected Value** – given outcomes and probabilities, determine the anticipated outcome, especially over many repetitions

 1) Identify the potential gains

 2) Multiply each gain by its probability

 3) Find the sum

 Ex. 1/10 win $5, 1/5 win $3 all others lose $2. What is the expected value?

**Binomial Expansion** – writing the expanded form of a binomial raised to a power, we can use Pascal’s triangle and / or combinations as shortcuts to write these expansions

 Ex. (2x + 4)5

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**Binomial Experiment** – a probability question of multiple independent events with the same individual probabilities when there are 2 possible outcomes (usually have EXACTLY)

 Binompdf(trials, probability of desired outcome, # of desired outcomes)

 \*Make sure the probability given and count given match\*

 Ex. Jim flips a coin 14 times, what is the probability of getting exactly 10 heads?

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