*Names*_____

AP Stats –Probability Project A (2-way tables)

Criteria	Example
1. Create a simple game with exactly 2 events	Event 1 - Pick Red or Black and draw a card from a standard deck with 2 jokers. Event 2 – Pick a number 1 to 6 and roll a die. The player can choose to pick for Event 1 only, Event 2 only, or both Event 1 and Event 2.
> are the events independent or dependent?	Each die is independent.
2. Construct possible outcomes and the probability for each using a two way table.	

	dice correct	dice wrong	total
Red	26•1=26	26•5=130	156
Black	26•1=26	26•5=130	156
White (joker)	2•1=2	2•5=10	12
total	54	270	324

The above table show the number of outcomes that meet each scenario.

	dice correct	dice wrong	total
Red	0.080	0.401	0.481
Black	0.080	0.401	0.481
White (joker)	0.006	0.031	0.037
total	0.167	0.833	1.000

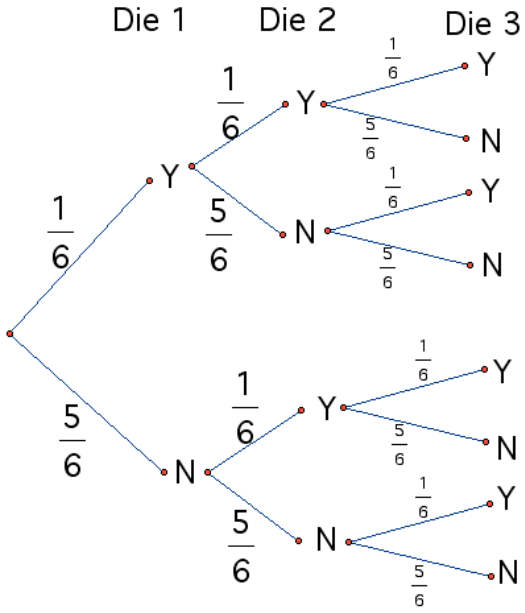
The above table show the percent for each scenario.

3. Decide on the payout for each type of game and calculate the expected outcomes.	Game type 1: pick the color will pay 1 to 1. Expected Outcome: .481(1) + .519(-1) = -.038 Game type 2: pick the number will pay 3 to 1 Expected Outcome: .167(3) + .833(-1) = -.333 Game type 3: pick the color and the number will pay 10 to 1 Expected Outcome: .08(10) + .92(-1) = -.12
4. Create a Game Board/Table that attracts players to your table and explains your game in simple language. You must include o A description of the rules o A description of the possible outcomes o The payout for each outcome o The probability for each outcome as a percent o The overall expected outcome for the game	

Place Your Token Three ways to win!		pays 1 to 1	
		Red	Black
pays 3 to 1	1	1 & Red	1 & Black
	2	2 & Red	2 & Black
	3	3 & Red	3 & Black
	4	4 & Red	4 & Black
	5	5 & Red	5 & Black
	6	6 & Red	6 & Black
Place your token!		pays 8 to 1	

***Names*_____**

AP Stats –Probability Project B (tree diagrams)

Criteria	**Example**
1. Create a simple game with at least 2 events	Pick a number from 1 to 6. Roll 3 dice. The more your number showed up, the better your prize.
> are the events independent or dependent?	Each die is independent.
2. Construct possible outcomes and the probability for each using a tree diagram.	

Possible Outcomes
The number selected can show up 0, 1, 2, or 3 times.
P(3 times) = (1/6)(1/6)(1/6) = 1/216 (.005)
P(2 times) = 3(1/6)(1/6)(5/6) = 15/216 (.069)
P(1 time) = 3(1/6)(5/6)(5/6) = 75/216 (.347)
P(0 times) = (5/6)(5/6)(5/6) = 125/216 (.579)

The Sum should be 1 .005 + .069 + .347 + .579 = 1

Criteria	Example
3. Figure out how much the player will win when they bet one token. Use your payouts to calculate the overall expected outcome per token played. Modify your payouts until you have a game that is attractive to potential players, but still gives you (the dealer) the long-term advantage. Remember, the closer the expected value is to 0 the more fair the game. If the expected value is positive, the odds are in the favor of the player. If the expected value is negative, the odds are in the favor of the house.	*My first attempt at creating the payouts:* Player bets 1 token and picks a number. 4 possible outcomes # hits 0 times = -1 (I keep the token) # hits 1 time = 0 (I return token) # hits 2 times = 1 (I return token and pay 1 token) # hits 3 times = 2 (I return token and pay 2 tokens) Expected Return for player: -1(125/216) + 0(75/216) + 1(15/216) + 2(1/216) = -108/216 or -.5 This heavily favors the house *My second attempt at creating the payouts:* Player bets 1 token and picks a number. 4 possible outcomes # hits 0 times = -1 (I keep the token) # hits 1 time = 1 (I return token) # hits 2 times = 2 (I return token and pay 1 token) # hits 3 times = 3 (I return token and pay 2 tokens) New Expected Return for player: -1(125/216) + 1(75/216) + 2(15/216) + 3(1/216) = -17/216 or -.079 This slightly favors the house.
4. Create a Game Board/Table that attracts players to your table and explains your game in simple language. You must include o A description of the rules o A description of the possible outcomes o The payout for each outcome o The probability for each outcome as a percent o The overall expected outcome for the game	**How You Are Graded:** 20% creation of game 20% tree diagram and percentages 20% payouts and expected outcome 20% game board/table 20% participation in the casino

You will hand this sheet to me with 4 signatures from me for the 4 parts described above.