Name _____

Experimental Probability, Theoretical Probability, and Odds

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1. In class, we flipped a coin 5 times and computed the experimental probability of getting tails. Then we flipped a coin 25 times and computed the experimental probability of getting tails. Now, flip a coin 50 times, recording whether you got heads or tails at each flip in the table below, and then compute the experimental probability of getting tails when you flip a coin.

Flip 1 -	Flip 11 -	Flip 21 -	Flip 31 -	Flip 41 -
Flip 2 -	Flip 12 –	Flip 22 -	Flip 32 -	Flip 42 -
Flip 3 -	Flip 13 -	Flip 23 -	Flip 33 -	Flip 43 -
Flip 4 -	Flip 14 -	Flip 24 -	Flip 34 -	Flip 44 -
Flip 5 -	Flip 15 -	Flip 25 -	Flip 35 -	Flip 45 -
Flip 6 -	Flip 16 -	Flip 26 -	Flip 36 -	Flip 46 -
Flip 7 -	Flip 17 -	Flip 27 -	Flip 37 -	Flip 47 -
Flip 8 -	Flip 18 -	Flip 28 -	Flip 38 -	Flip 48 -
Flip 9 –	Flip 19 -	Flip 29 -	Flip 39 -	Flip 49 -
Flip 10 -	Flip 20 -	Flip 30 -	Flip 40 -	Flip 50 -

P_e(Tails) =

Suppose we flipped a coin 100 times, 1000 times, 10,000 times, 100,000 times, and then 1,000,000 times. Also assume that after each round of flipping we calculated the experimental probability of getting tails. As the number of flips in each round increases, what do you think happens to the experimental probability of getting tails?

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2. Take a regular deck of cards and shuffle well. Draw one card from anywhere in the deck. Note whether this card is a black suit or a red suit in the table below. Put your card back in the deck and shuffle well. Draw another card from anywhere in the deck. Again note whether this card is a black suit or a red suit in the table below. If you repeat this process a total of 10 times, find the experimental probability that a card drawn from a regular deck of cards is a black suit.

1st draw -	3rd draw -	5th draw -	7th draw -	9th draw -
2nd draw -	4th draw -	6th draw -	8th draw -	10th draw -

P_e(black suit) =

3. In class we computed the sample space when we flipped a coin 3 times and then we computed the theoretical probability of having exactly one tail in those 3 flips. Now, write down the sample space when we flip a coin 4 times. Then compute the theoretical probability of having exactly 2 heads appear in those 4 flips.

   Sample Space:

$$P_t(2 \text{ heads}) =$$

4. In class we computed the sample space when we roll a die two times and then we computed the theoretical probability of having rolled two 1's. Now, write down the sample space when we roll a die 3 times. Then compute the theoretical probability of rolling a 2, 3, and 5 (not necessarily in this order).

   Sample Space:

$$P_t(\text{rolling a 2, 3, and 5}) =$$

5. Suppose that your roll 2 dice. What are the odds that you rolled doubles? Be sure to justify your answer.

6. If you shuffle a regular deck of cards and draw a card at random from the deck, what are the odds that the card you drew is a black queen? Be sure to justify your answer.

7. What is the difference between experimental probability and theoretical probability?

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8. Where might experimental probability, theoretical probability, and odds be used in the real world today?

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9. How does the probability of an event occurring and the odds of an event occurring differ?

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