

UW Math Circle
November 7, 2013

1. Toss a coin 10 times, and record whether each flip was a head or tail:

On the whiteboard, record the number of flips that came up tails. In the computer, record the outcome of all ten of your flips.



2. When you flip a coin 10 times, how many possible *outcomes* are there? (How many different sequences of heads and tails could possibly come up?)
3. If someone else flipped a coin 10 times, what is the probability that she would get the same number of tails as you did?



4. If everyone else in the classroom flipped a coin 10 times, how many people would you expect to get the same number of tails as you did?

5. In the table below, record the number of ways in which you could have k tails come up when you flip a coin 10 times. What is the probability of getting k tails in 10 flips?

k	Number of ways to get k tails in 10 flips	Probability of getting k tails in 10 flips
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

6. Based on the data we have collected, when you flip a coin 10 times what is the average number of times you must flip a coin before the first tail appears?

7. Mathematically, what is the probability that if you flip a coin 10 times, the first tail appears on the k th flip?

k	Number of times the first tail to appear on the k th flip	Probability that the first tail appears on the k th flip	k	Number of times the first tail to appear on the k th flip	Probability that the first tail appears on the k th flip
1			6		
2			7		
3			8		
4			9		
5			10		

8. If you flip a coin 10 times, what is the expected value for the number of times you must flip the coin before seeing a tail?

9. If you start flipping a coin, what is the expected value for the number of times you must flip the coin before seeing a tail?

10. What else can you ask about probability and coin flips? Investigate some other property of a sequence of coin flips with your group and determine the probability and expected values for the property you choose.

