Guessing on a True/False Test

You are about to take a unit test in your history class, but you have not studied or reviewed any of the material covered on the test. The test consists of ten statements, which you are to label as true or false. You decide to guess at each response.

Suppose you need at least six correct responses to pass the test, and you want to estimate the likelihood that you will pass. To determine the likelihood of a possible score theoretically, we would need to list every combination of outcomes. There are too many combinations to list for this example. Therefore, you will **simulate** guessing on the test by flipping a coin ten times. Each coin flip represents one statement on the test. Let heads represent a *success* (selecting the correct response) and tails represent a *failure* (answering incorrectly).

1. Toss a coin 10 times and record your results in the table below.

Trial	1	2	3	4	5	6	7	8	9	10
Response										

a. According to your results, how many questions were answered correctly?

b. Suppose you tossed the coin ten more times. Would you expect to see the same results?

Let each set of ten tosses represent a **trial** in this investigation. To estimate the probability of passing the test, you need to determine the experimental probability that yields at least six successes, or correct responses.

2. Perform twenty trials to simulate taking the test 20 times and record the number of successes for each trial.

Trial	# Successes in ten tosses	Trial	# Successes in ten tosses	Trial	# Successes in ten tosses	Trial	# Successes in ten tosses
1		6		11		16	
2		7		12		17	
3		8		13		18	
4		9		14		19	
5		10		15		20	

3. Based on the data, what is the probability of guessing the correct response at least 6 times, passing the test? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

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Answer Key

1. The results will vary. Consider the following ten tosses:

Trial #	1	2	3	4	5	6	7	8	9	10
Response	S	S	F	S	F	F	F	S	F	F

   a. Answers will vary. For the results above, there were 4 successes or correct responses.
   b. No.

2. The results will vary. Consider the following twenty trials:

Trial	# Successes	Trial	# Successes	Trial	# Successes	Trial	# Successes
1	3	6	2	11	4	16	4
2	6	7	4	12	6	17	5
3	7	8	4	13	3	18	3
4	6	9	7	14	5	19	7
5	6	10	7	15	2	20	5

3. Answers will vary. According to the above results, 8 out of 20 of the trials yielded at least six successes.

$$\frac{8}{20} = 0.40$$