

STAT 1350, 3/24 Discussion Questions

1. If I toss a fair coin five times and the outcomes are TTTTT, then the probability that tails appears on the next toss is what?

$$\frac{1}{2}$$

2. The *probability* of an outcome of a random phenomenon is defined as what?

the proportion of times the outcome occurs

3. It is known that about 82% of Dr. Street's introductory statistics students pass his course. What is the probability that a randomly selected student from Dr. Street's current introductory statistics course will earn a passing grade?

$$82\%$$

Suppose you have five friends: Malik, Samson, Quint, Jennifer, and Monique.

4. You randomly choose one of them to attend a basketball game with you. What is the probability that you choose Quint?

$$\frac{1}{5}$$

5. You randomly choose one of them to attend a basketball game with you. What is the probability that you choose a friend whose name starts with the letter "M"?

$$\frac{2}{5}$$

6. You randomly choose four of them to attend a basketball game with you. What is the probability that Jennifer is not chosen to attend the game with you?

$$\frac{1}{5}$$

7. You randomly choose four of them to attend a basketball game with you. What is the probability that you choose at least one friend whose name starts with the letter "M"?

0 (at least one M friend must go with)

8. Suppose you studied very hard for this test, and you believe that the probability that you'll pass the test is 0.99. Which of the following statements is true?

- A) The value 0.99 is a personal probability. *true*
B) The value 0.99 indicates that you don't expect to pass the test. *false*
C) You'll be surprised if you don't pass the test. *true*
D) Both (A) and (B) are true.
E) Both (A) and (C) are true.

9. The odds against racehorse #9 (named "Southern Comfort") winning this year's Southeastern Derby are 7 to 3 (7:3 odds against winning). What is the probability that "Southern Comfort" will win this year's Southeastern Derby?

$$\frac{3}{10} = 30\%$$

10. The Virginia State Lottery Commission states that the probability of winning a prize in their new scratch-off ticket lottery is 0.31. What are the odds against winning a prize in this new lottery game?

$$69:31$$

11. What are the possible values that a probability can take? Give an example of a probability that violates this rule?

anything between 0 and 1 inclusive
 -0.14 or 1.3 are bad

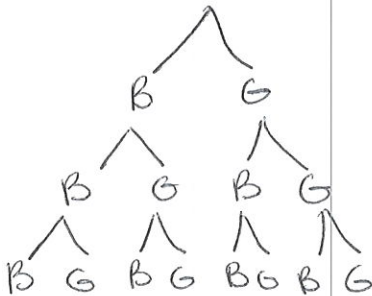
12. All probabilities must add to what value?

Sum to one

13. What is the difference between an experimental probability, a theoretical probability and a personal probability?

experimental is the results observed through trials, theoretical is proportions of possible outcomes, personal is best guess w/ calculations

14. Suppose that children are assigned randomly to a school classroom, and the chance of a child being a boy or a girl is exactly equal. Draw a tree diagram to find the number of ways 3 children can be selected to join a class. Then use that tree to determine the probability that two of the three children are girls.



total is 8

outcomes are:

BBB, BBG, BGB, BGG, GBB, GBG, GGB, GGG

3 of these have 2 girls, so $\frac{3}{8}$

15. Suppose that you have three friends Delilah, Ester and Franklin. You'd like to take one friend with you to Cedar Point. You'd also like to take one friend with you to the Rock-n-Roll Hall of Fame. If you choose which friend to go with you at random, use a tree diagram to find all the different ways your three friends can go with you. And use that to determine the probability that Ester went with you on at least one of the trips.



outcomes are: DD, DE, DF, ED, EE, EF, FD, FE, FF

trips w/ Ester are 5

so $\frac{5}{9}$

total outcomes is 9

STAT 1350, 3/26 Discussion Questions

1. What is the term for a random phenomenon ^{that} describes all the possible outcomes and indicates how to assign probabilities to any collection of outcomes.

probability model, or probability distribution

2. What is the term for the distribution of a statistic ^{that} indicates what values the statistic takes in repeated samples from the same population and how often it takes those values.

Same as #1

3. An experiment has four possible outcomes: A, B, C, and D. Which of the following is a legitimate assignment of probabilities for these four events?

- A) 0.2, 0.2, 0.2, 0.2 *adds to .8, no* D) 0.4, 0.4, 0.4, 0.4 *adds to 1.6, no*
 B) 0.3, 0.3, 0.3, 0.1 *o.k.a* E) Both (B) and (C)
 C) 0.6, 0.2, 0.3, -0.1 *no negatives, no*

If we roll a pair of fair dice and count the number of aces (one dot) showing, the probability model is as follows:

| Count of aces | Probability |
|---------------|-----------------|
| 0 | ? |
| 1 | $\frac{10}{36}$ |
| 2 | $\frac{1}{36}$ |

$\frac{10}{36} > \frac{1}{36}$ $1 - \frac{1}{36} = \frac{25}{36}$

4. The probability of no aces is

$\frac{25}{36}$

5. In backgammon, one rolls a pair of two fair dice. The probability of getting a sum of 7 is

36 total outcomes

(3,4) (4,3) (5,2) (2,5) (1,6) (6,1) sum to 7

$\frac{6}{36} = \frac{1}{6}$

6. Use a tree diagram to find all the ways that four coins can be tossed (or the same coin tossed 4 times) according to whether they come up heads or tails. Use that to state the probability distribution for the number of heads after 4 tosses to complete the table.

| # of Heads in 4 tosses | 0 | 1 | 2 | 3 | 4 |
|------------------------|----------------|----------------|----------------|----------------|----------------|
| Probability | $\frac{1}{16}$ | $\frac{4}{16}$ | $\frac{6}{16}$ | $\frac{4}{16}$ | $\frac{1}{16}$ |