

1. Define probability.

\_\_\_\_\_ 2. Suppose a penny is tossed and an observation is made whether it lands heads up or tails up. Suppose the penny is fair, the probability of heads is .5 and the probability of tails is .5. This means . . .

- a. If a head is flipped, a tail will be flipped in the next two to three tosses.
- b. If the coin is flipped many times, the proportion of heads will be approximately .5, and that proportion will tend to get closer and closer to .5 as the number of tosses increases.
- c. Regardless of the number of flips, half will be heads and half will be tails.
- d. All of the above.

\_\_\_\_\_ 3. A basketball player makes 160 out of 200 free throws. The estimated probability that he makes his next free throw is:

- a. 0.16
- b. .5 (he either makes it or he doesn't)
- c. 0.8
- d. 1.2

Suppose we wanted to know the mean salary of adult women ages 21-40 living in the United States, so we do a stratified random sample of 10,000 women and find the mean of those women to be \$22,000..

4. What is the parameter? \_\_\_\_\_

5. What is the statistic? \_\_\_\_\_

Drawing an M&M candy out of a bag means drawing one of six colors. Assume the chart below gives the probability of colors of a chosen M&M.

Brown	Red	Yellow	Green	Orange	Tan
.3	.3	?????	.1	.1	.1

6. The probability of drawing a yellow is: \_\_\_\_\_

7. The probability of not drawing a red is: \_\_\_\_\_

8. The probability of drawing a red or green is: \_\_\_\_\_

9. The probability of not drawing a blue is: \_\_\_\_\_

10. The probability of not drawing a purple is: \_\_\_\_\_

11. A roulette wheel has 16 red spaces, 16 black spaces, and 2 green spaces. Players can double their money by betting on red or black. The green spaces belong to the house. Explain why a casino will always make money in the long run from the roulette wheel.

12. Suppose that the probability that you buy a collared shirt is 0.7. Suppose that the probability that you buy a green shirt is 0.1. Suppose that the probability that you buy a green collared shirt is 0.3. What is the probability that you buy a collared shirt or a green shirt?

13. In a particular games, a fair die is tossed. If you roll a four or five, you win \$1. If you roll a six, you win \$4. If you roll a 1, 2, or 3, you don't win squat. What is the probability that play the game five times and win \$4 all five times?

14. In a certain game, the probability that you win is 0.6. Suppose you play the game 7 times, what is the probability that you will win exactly four times?

15. Playing the same game as in #14, suppose you play the game 7 times, what is the probability that you will win at least four times?

16. Here are the counts (in thousands) of earned degrees in the United States in recent year, classified by level and by the sex of the degree recipient:

a. What is the  $P(\text{Doctorate} \setminus \text{Female})$ ?

b. What is  $P(\text{Male} \setminus \text{Master's})$ ?

17. Suppose  $P(A)=0.8$  and  $P(B|A)=0.5$ , what is the probability that A and B both occur?

18. What is the probability of dealing yourself a royal flush (A, K, Q, J, 10 of one suit) given a deck of 52 cards and then doing it again immediately after you get done celebrating your good luck?

Bonus: In a certain town, 50% of the households own a cell phone, 40% own a pager, and 20% own both. What percent own neither?