

Probability

1. You roll a fair 8-sided die.

What is the sample space?



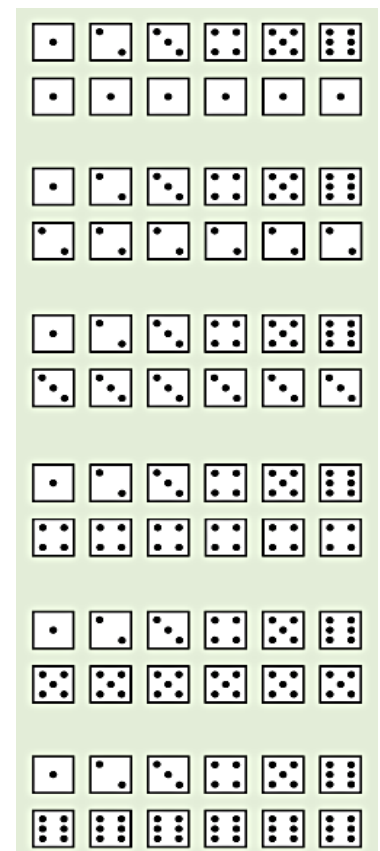
What is the probability that you roll

- a. an odd number?
- b. a number that is greater than 5?
- c. a number that is at least 4?
- d. a number that is at most 6?
- d. a number that is not 1?
- e. a number that is a multiple of 3?

2. You roll two fair dice.

What is the probability that

- a. you roll a double?
- b. both numbers are even?
- c. the sum of the numbers is 9?
- d. one number is odd and the other one is even?
- e. the sum is 5 or 6?
- f. you roll a double or the sum is 8?



Probability

You have a deck of cards.

1. If you select one card randomly, what is the probability that it will be a diamond?
2. If you select one card randomly, what is the probability that it will be a king?
3. If you select one card randomly, what is the probability that it will be the king of hearts?
4. If you select one card randomly, what is the probability that it will be a diamond or a club?
5. If you select one card randomly, what is the probability that it will be a king or a queen?
6. If you select one card randomly, what is the probability that it will be a diamond or a king?
7. If you select one card randomly, what is the probability that it will be a spade or a 2?
8. If you select one card randomly, what is the probability that it will be a club or a queen?
9. If you select two cards randomly with replacement, what is the probability that the first one will be a diamond and the second one will be a king?
10. If you select two cards randomly with replacement, what is the probability that the first one will be a queen and the second one will be a king?
11. If you select two cards randomly with replacement, what is the probability that both of them will be a king?
12. If you select two cards randomly without replacement, what is the probability that the first one will be a spade and the second one will be a heart?
13. If you select two cards randomly without replacement, what is the probability that the first one will be a queen and the second one will be a king?
14. If you select two cards randomly without replacement, what is the probability that both of them will be a 6?

15. Identify the sample space:
- Guessing the last digit in a phone number
 - Tossing three coins
16. A multiple choice quiz has 5 questions each with four possible answers. Only one of them is correct.
- What's the probability that a student gets a 100% on the quiz simply by guessing the answers?
 - What's the probability that a student gets a 0 on the quiz simply by guessing the answers?
17. A beverage company puts game pieces under the caps of its drinks and claims that one in six game pieces wins a prize. The official rules of the contest state that the odds of winning a prize are 1:6. Is the claim "one in six game pieces wins a prize" correct? Why or why not?
18. Decide whether the events are independent or dependent:
- Tossing a coin and getting a head (event A), and then rolling a six-sided die and obtaining a 6 (event B).
 - Practicing the piano (event A), and then becoming a concert pianist (event B).
 - Selecting a king from a standard deck of cards (event A), replacing it, and then selecting a queen from the deck (event B).
 - Selecting a king from a standard deck of cards (event A), not replacing it, and then selecting a queen from the deck (event B).
19. The following table shows the results of a survey in which 102 men and 103 women workers ages 25 to 64 were asked if they have at least one month's income set aside for emergencies.
- | | Men | Women | Total |
|------------------------------|-----|-------|-------|
| Less than one month's income | 47 | 59 | 106 |
| At least one month's income | 55 | 44 | 99 |
| Total | 102 | 103 | 205 |
- Find the probability that a randomly selected worker has one month's income or more set aside for emergencies.
 - Given that a randomly selected worker is a male, find the probability that the worker has less than one month's income.
 - Given that a randomly selected worker has one month's income or more, find the probability that the worker is a female.
 - Are the events of having less than one month's income or more saved and being male independent or dependent? Why?
20. A company's machine which produces mugs has a probability of 0.004 of producing a defective mug. If this machine is used to make 4 mugs, find the probability that

- a. none of the mugs are defective
 - b. at least one of the mugs is defective
 - c. all the mugs are defective
21. A company that makes cartons finds
- The probability of producing a carton with a puncture is 0.05
 - The probability of producing a carton with smashed corner is 0.08
 - The probability that a carton has a puncture and has a smashed corner is 0.004.
- a. Are the events “selecting a carton with a puncture” and “selecting a carton with a smashed corner” disjoint?
 - b. If a quality inspector randomly selects a carton, find the probability that the carton has a puncture or has a smashed corner.
22. A student wants to assign 7 different books to 3 spaces, how many different possibilities are there?
23. There are 15 available toppings in a pizza restaurant. If Maria will order a 4-topping pizza, how many different pizzas could she order?
24. An abstract painter has 15 colors on her pallet to work with. If she decides she will paint with exactly 5 colors, how many different combinations of colors can she choose from?
25. In a race with 30 runners where 8 trophies will be given to the top 8 runners (the trophies are distinct: first place, second place, etc), how many ways can this be done?
26. Sally has 10 shirts, 5 pairs of pants, and 6 pairs of shoes. How many different outfits are possible?
27. How many ways can three books be selected from a pile of 10 books?
28. How many ways to select a president, VP, and treasurer from a club having 50 members?
29. How many ways to select a committee of three from a club having 50 members?
30. How many ways to make a 4 flavor ice cream cone (all flavors different) if you care about the order of scoops on the cone and there are 32 possible flavors?
31. How many ways to make a four flavor milk shake (all flavors different) from a selection of 32 flavors?
32. How many ways can you arrange the letters of MISSISSIPPI?