COUNTING HOMEWORK

AUXILIARY TEXT: 7.1, 7.2, 7.3

LAST NAME	FIRST NAME	DATE

1. Acme Pizza offers 3 kinds of salads, 15 kinds of pizza, and 4 kinds of dessert. How many different three-course meals can be ordered?

2. How many ways can the letters in the word **SCRAMBLE** be arranged?

3. My closet has 20 shirts. How many ways are there to pick 7 of these shirts to pack for my spring break vacation?

4. In a department with 30 members, how many ways are there to choose 3 members for a committee?

5. Camille and her partner want to schedule two nights out in July, and two more in August (either month has 31 days). How many ways are there to write the schedule if all four dates have to be distinct?

6. In a class with 30 students, how many ways are there to elect a president, a vice president, and a secretary?

7. A quiz has four multiple-choice questions. Each question has five choices and only one choice is the correct answer. Suppose that you guess on all four questions. What is the probability you will get every question wrong?

8. A certain game is played with three decks of cards: a deck of ten action cards, a deck of seven treasure cards, and a deck of six monster cards. The decks are not mixed together, and each deck is shuffled separately. How many different arrangements of cards are possible at the beginning of the game?

For a certain game, a fair coin is tossed and a six-sided die is rolled.

9. What is the total number of all possible outcomes?

10. Find the probability that coin shows heads **and** the die shows ⚅

11. Find the probability that coin shows heads **or** the die shows ⚅

---

12. You are playing Crazy Pineapple poker and you have been dealt a hand of 3 cards from a well shuffled 52-card deck. What is the probability of drawing 3 Aces?

13. An animal shelter houses 7 white and 9 black kittens. If 4 are adopted in a single day, what is the probability that all 4 are the same color?

14. Howard picks a 5-digit PIN by mashing the key pad with his palm. If all 5-digit PINs are equally likely, what are the chances that every digit is 7, 8, or 9?

15. At a wedding, the bride and groom and their six friends need to arrange themselves in a line for a photo. The bride and groom need to be in the middle, with three of the friends on either side. In how many ways can they arrange themselves for the photo?

Ivan wants to queue up 4 *Invader Zim* episodes, and he is going to choose them out of the 28 episodes in the series.

16. How many different playlists are there, if the episodes have to be distinct, and the order in which episodes are shown matters?

17. How many different playlists are there, if the episodes have to be distinct, and the order in which episodes are shown does not matter?

18. How many different playlists are there, if the order in which episodes are shown matters, and episodes do not have to be distinct?

In the game of Five Card Draw each player gets five cards out of the standard 52-card deck. If the cards are well shuffled, then we can assume that every possible arrangement of five distinct cards (called **hand**) is equally likely.

19. How many different hands are there?

20. What are the chances of a *royal flush*: TJQKA, all of the same suit?

21. How likely is one to draw at least one Ace?

22. Find the probability of a *full house*: a three of a kind and a pair, for example QQQAA.

23. Find the likelihood of a *two pair*: two different pairs and one other card, like JJ773.

24. Find the probability of a *straight*, which is five cards in a sequence, where an Ace can be the lowest or the highest card, for example A2345, or 89TJQ, or TJQKA, with any combination of suits.

Penelope, Qin, Rina, Samira, and Tenzin are all interested in going to a new movie together. Chances are, not all of them can make it work with their schedules, so suppose that any subset of the five friends is equally likely to show up for the movie.

25. What is the size of the sample space?

26. What are the chances that Penelope shows up, but Tenzin does not?

Suppose that an unknown password consists of 5 capital English letters, and all possible passwords are equally likely.

27. How many different passwords contain a substring “MEW”, and what are the chances of that happening?

28. How many different passwords contain a substring “HEH”, and what are the chances of that happening?

Answers

1. 180

3. 77520

5. 216225

7. 0.4096

9. 12

11. 7/12

13. 0.08846154

15. 1440

17. 20475

19. 2598960

21. 0.341158

23. 0.04753902

25. 32

27. 2028 passwords, each coming up with probability 0.0001706873