Prob/Stat/Discrete

Homework 2.3 & 2.4 Name____________________________

In Exercises 1 and 2, does the problem involve permutation or combinations? Explain your answer. (It is not necessary to solve the problem.)

1. Fifty people purchase raffle tickets. Three winning tickets are selected at random. If first prize is $1000, second prize is $500, and third prize is $100, in how many different ways can the prizes be awarded?
2. Fifty people purchase raffle tickets. Three winning tickets are selected at random. If each prize is $500, in how many different ways can the prizes be awarded?

In Exercises 3-10, use the formula for ${}_nC_r$ *to evaluate each expression.*

3. ${}_8C_7$
4. ${}_{10}C_6$
5. ${}_{12}C_5$
6. ${}_7C_1$
7. ${}_4C_4$
8. ${}_{25}C_4$
9. ${}_6C_0$
10. $\frac{{}_{10}C_3}{{}_6C_4}$

In Exercises 11-14, evaluate each expression.

11. $\frac{{}_{20}P_2}{2!} - {}_{20}C_2$
12. $1 - \frac{{}_5P_3}{{}_{10}P_4}$
13. $\frac{{}_{10}C_3}{{}_6C_4} - \frac{46!}{44!}$
14. $\frac{{}_5C_1 * \ {}_7C_2}{{}_{12}C_3}$

Use the formula for ${}_nC_r$ *to solve Exercises 15-18.*

15. A four-person committee is to be elected from an organization's membership of 11 people. How many different committees are possible?
16. There are 14 standbys who hope to get seats on a flight, but only 6 seats are available on the plane. How many different ways can the 6 people be selected?
17. Of the 100 people in the U.S. Senate, 18 serve on the Foreign Relations Committee. How many ways are there to select Senate members for this committee (assuming party affiliation is not a factor in the selection)?
18. To win in the New York State lottery, one must correctly selected 6 numbers from 59 numbers. The order in which the selection is made does not matter. How many different selections are possible?

In Exercises 19-23, solve by the method of your choice.

19. A book club offers a choice of 8 books from a list of 40. In how many ways can a member make a selection?
20. Fifty people purchase raffle tickets. Three winning tickets are selected at random. If the first prize is $1000, second prize is $500, and third prize is $100, in how many different ways can the prizes be awarded?
21. Fifty people purchase raffle tickets. Three winning tickets are chosen at random. If each prize is $500, in how many different ways can the prizes be awarded?
22. Nine comedy acts will perform over two evenings. Five of the acts will perform on the first evening. How many ways can the schedule for the first evening be made?

23. Baskin- Robbins offers 31 different flavors of ice cream. One of its items is a bowl consisting of three scoops of ice cream, each a different flavor. How many such bowls are possible?

Use the formula for $_nC_r$ and the fundamental Counting Principal to solve Exercises 24 and 25.

24. How many different committees can be formed from 5 professors and 15 students if each committee is made up of 2 professors and 10 students?
25. A mathematics exam consists of 10 multiple-choice questions and 5 open-ended problems in which all work must be shown. If an examinee must answer 8 of the multiple-choice questions and 3 of the open-ended problems, in how many ways can the questions and problems be chosen?

In Exercises 26-30, a die is rolled. The set of equally likely outcomes is {1, 2, 3, 4, 5, 6}. Find the probability of rolling

26. a 5.
27. *a number greater than 3.*
28. *a number greater than 4.*
29. *a number less than 8.*
30. *a number greater than 8.*

In Exercises 31-35, you are dealt one card from a standard 52-card deck. Find the probability of being dealt

31. a jack.
32. a diamond.
33. a card greater than 3 and less than 7.
34. the ace of clubs.
35. *a card with a green heart.*

In Exercises 36-38, a fair coin is tossed two times in succession. The set of equally likely outcomes is {HH, HT, TH, TT}. Find the probability of getting

36. Two tails.
37. Different outcomes on each toss.
38. At least one head.

In Exercises 39-42, you select a family with three children. If M represents the male child and F represents a female child, the set of equally likely outcomes for the children's genders is {MMM, MMF, MFM, MFF, FMM, FMF, FFM, FFF}. Find the probability of selecting a family with

39. Exactly one male child.
40. Exactly two female children.
41. At least two female children.
42. Fewer than four female children.

In Exercises 43-46, a single die is rolled twice. The 36 equality likely outcomes are shown as follows:

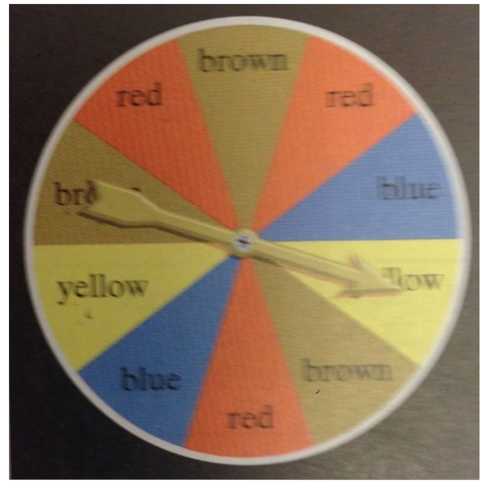
Second Roll

First Roll	1	2	3	4	5	6
1	11	12	13	14	15	16
2	21	22	23	24	25	26
3	31	32	33	34	35	36
4	41	42	43	44	45	46
5	51	52	53	54	55	56
6	61	62	63	64	65	66

Find the probability of getting

43. Two odd numbers.
44. Two numbers whose sum is 6.
45. Two numbers whose sum is less than 13.

Use the spinner shown to answer Exercises 46-49. Assume that it is equally probable that the pointer will land on any one of the ten colored regions. If the pointer lands on a borderline, spin again.



Find the probability that the spinner lands in

46. A yellow region.
47. A brown region.
48. A region that is yellow or brown.
49. A region that is yellow and brown.

The table shows the distribution, by age and gender, of the 29.3 million Americans who live alone. Use the data in the table to solve Exercises 50-56.

Find the probability, expressed as a decimal rounded to the nearest hundredth, that s randomly selected American living alone is.

50. Male.
51. Female.
52. In the 25-34 age range.
53. In the 35-44 age range.
54. A woman in the 15-24 age range.
55. A man in the 45-64 age range.

NUMBER OF PEOPLE IN THE UNITED STATES LIVING ALONE, IN MILLIONS

	Ages 15–24	Ages 25–34	Ages 35–44	Ages 45–64	Ages 65–74	Ages ≥75	Total
Male	0.7	2.2	2.6	4.3	1.3	1.4	12.5
Female	0.8	1.6	1.6	5.0	2.9	4.9	16.8
Total	1.5	3.8	4.2	9.3	4.2	6.3	29.3

Source: U.S. Census Bureau