Homework 2.6                                             Name_____

*In Exercises 1-3, you are dealt one card from a 52-card deck. Find the probability that you are not dealt.*

1. A 3.
2. A club.
3. A red picture card.

*In 5-card poker, played with a standard 52-card deck, $_{52}C_5$, or 2,598,960, different hands are possible. The probability of being dealt various hands is the number of different ways they can occur divided by 2,598,960. Shown in Exercises 4 and 5 are various types of poker hands and their probabilities. In each exercise, find the probability of not being dealt this type of hand.*

4. **Type of Hand-** Four of a kind: 4 cards with the same number plus 1 additional card.
   **Number of Ways the Hand Can Occur-** 624
   **Probability-** $\dfrac{624}{2,598,960}$

5. **Type of Hand-** Flush: 5 cards of the same suit (excluding royal flush and straight flush)
   **Number of Ways the Hand Can Occur-** 5108
   **Probability-** $\dfrac{5108}{2,598,960}$

*The graph shows the probability of cardiovascular disease, by age and gender. Use the information in the graph to solve Exercise 6. Express all probabilities as decimals, estimated to two decimal places.*
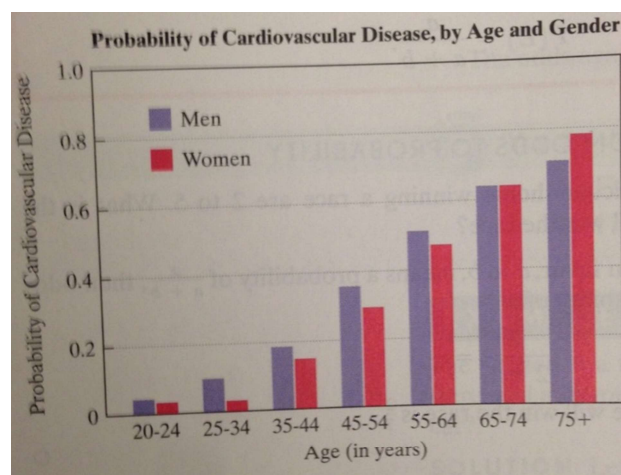


6.
   a. What is the probability that a randomly selected woman, 75 or older, has cardiovascular disease?
   b. What is the probability that a randomly selected woman, 75 or older, does not have cardiovascular disease?

*The table shows the distribution, by annual income, of the 112 million households in the United States in 2003, with all numbers rounded to the nearest million. Use this distribution to solve 7 and 8.*

INCOME DISTRIBUTION OF U.S. HOUSEHOLDS, IN MILLIONS

| Annual Income | Number | Annual Income | Number |
|---|---|---|---|
| Less than $10,000 | 10 | $35,000–$49,999 | 17 |
| $10,000–$14,999 | 8 | $50,000–$74,999 | 20 |
| $15,000–$24,999 | 15 | $75,000–$99,999 | 12 |
| $25,000–$34,999 | 13 | $100,000 or more | 17 |

Source: U.S. Census Bureau

*If one household is randomly selected from this population, find the probability, expressed as a simplified fraction that*

7. The household income is not in the $15,000-$24,999 range.
8. The household income is at least $10,000.

*In exercises 9-11, you randomly select one card from a 52-card deck. Find the probability of selecting*

9. A 7 or an 8.
10. A red 7 or a black 8.
11. The 7 of hearts or the 8 of spades.

12. A political discussion group consists of 30 Republicans, 25 Democrats, 8 Independents, and 4 members of the Green party. If one person is randomly selected from the group, find the probability of choosing an Independent or a Green.

*In Exercise 13, a single die is rolled. Find the probability of rolling*

13. An odd number or a number less than 4.

*In Exercises 14 and 15, you are dealt one card from a 52-card deck. Find the probability that you are dealt*

14. A 5 or a black card
15. A card greater than 2 and less than 7, or a diamond.

*In Exercises 16 and 17, it is equally probable that the pointer on the spinner shown will land on any one of the eight regions, numbers 1 through 8. If the pointer lands on a borderline, spin again.*



*Find the probability that the pointer will stop on*

16. An odd number or a number greater than 3.
17. An even number or a number less than 4.

*Use this information to solve Exercises 18 and 19. The mathematics department of a college has 8 male professors, 11 female professors, 14 male teaching assistants, and 7 female teaching assistants. If a person is selected at random from the group, find the probability that the selected person is*

18. A professor or a female.
19. A teaching assistant or a male.

20. A student is selected at random from a group of 200 students in which 135 take math, 85 take English, and 65 take both math and English. Find the probability that the selected student takes math or English.

*The table shows the educational attainment of the U.S. population, ages 25 and over, in 2004. Use the data in the table, expressed in millions, to solve Exercises 21-24.*

EDUCATIONAL ATTAINMENT OF THE U.S. POPULATION, AGES 25 AND OVER, IN MILLIONS

| | Less Than 4 Years High School | 4 Years High School Only | Some College (Less than 4 years) | 4 Years College (or More) | Total |
|---|---|---|---|---|---|
| Male | 14 | 28 | 22 | 26 | 90 |
| Female | 14 | 32 | 26 | 25 | 97 |
| Total | 28 | 60 | 48 | 51 | 187 |

Source: U.S. Census Bureau

*Find the probability, expressed as a simplified fraction, that a randomly selected American, aged 25 or over.*

21. Has not completed four years of high school.
22. Has completed less than four years of high school or four years of high school only.
23. Has completed four years of high school only or is a woman.

*Find the odds in favor, and the odds against a randomly selected American, aged 25 and over, with*

24. Less than four years of high school

*The graph shows the distribution, by branch and gender, of the 1.43 million, or the 1430 thousand, active-duty personnel in the U.S. military in 2003. Numbers are given in thousands and rounded to the nearest ten thousand. Use the data to solve Exercises 25-30.*



Active Duty U.S. Military Personnel

Source: U.S. Defense Department
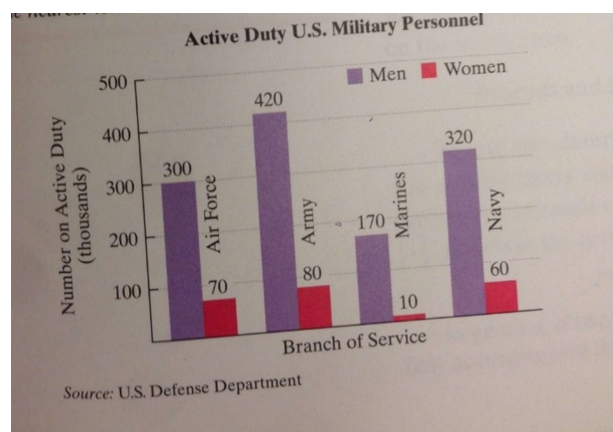
*If one person is randomly selected from the population represented in the bar graph in the previous column, find the probability, expressed as a simplified fraction, that the person*

25. Is not in the Marines
26. Is in the Army or is a woman
27. Is in the Army or the Navy

*Find the odds in favor and the odds against a randomly selected person from the population represented in the bar graph in the previous column being*

28. In the Army
29. A woman in the Air Force.
30. A woman

*In Exercises 31 and 32, a single die is rolled. Find the odds*

31. *In favor of rolling a number less than 5.*
32. *Against rolling a number less than 5.*

*The circle graphs shows the percentage of children in the United States whose parents are college graduates in one-parent house-holds and two-parent households. Use the information shown to solve Exercise 33.*



Percentage of U.S. Children
Whose Parents Are College Graduates

9%

29%

In One-Parent Households

In Two-Parent Households

*Source:* U.S. Census Bureau
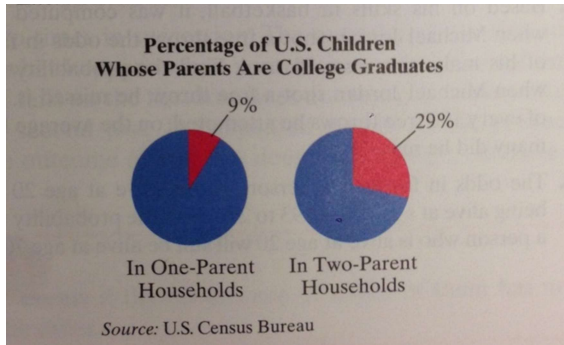
33.
    a. *What are the odds in favor of a child in a two-parent household having parents who are college graduates?*
    b. *What are the odds against a child in a two-parent household having parents who are college graduates?*

*In Exercises 34-38, one card is randomly selected from a deck of cards. Find the odds*

34. *In favor of drawing a picture card.*
35. *In favor of drawing a black card.*
36. *Against drawing a 5.*
37. *Against drawing a red jack.*
38. *Against drawing a club greater than 4 and less than 10.*

39. *The winner of a raffle will receive a 30-day all-expense-paid trip throughout Europe. If 5000 raffle tickets were sold and you purchased 30 tickets, what are the odds against your winning the trip?*

*Of the 38 plays attributed to Shakespeare, 18 are comedies, 10 are tragedies, and 10 are histories. In Exercises 40-43, one play is randomly selected from Shakespeare's 38 plays. Find the odds*

40. In favor of selecting a tragedy
41. Against selecting a comedy
42. In favor of selecting a tragedy or a history
43. Against selecting a comedy or history.

44. If you are given odds of 3 to 7 in favor of winning a bet, what is the probability of winning the bet?
45. The odds in favor of a person who is alive at age 20 still being alive at age 70 are 193 to 270. Find the probability that a person who is alive at age 20 will still be alive at age 70.

*Exercise 46 give the odds against various flight risks. (Source: Men's Health, August 2005) Use these odds to determine the probability of the underlined event for those in flight.*

46. Odds against deep-vein thrombosis (blood clot in the leg): 28 to 1.