

Extra Practice

Chapter 11

Lesson 11-1

Evaluate each expression.

- | | | |
|----------------------|------------------|-------------------------------|
| 1. $6!$ | 2. $3!4!$ | 3. $\frac{7!}{4!}$ |
| 4. $\frac{6!2!}{8!}$ | 5. ${}_8P_5$ | 6. ${}_4C_1$ |
| 7. ${}_6C_2$ | 8. ${}_6P_2$ | 9. ${}_7C_3$ |
| 10. ${}_7P_3$ | 11. $2({}_7C_5)$ | 12. $\frac{{}_7C_5}{{}_5C_2}$ |

For each situation, determine whether to use a permutation or a combination. Then solve the problem.

- How many different orders can you choose to read six of the nine books on your summer reading list?
- How many ways are there to choose five shirts out of seven to take to camp?
- How many ways can you choose two out of four kinds of flowers for a bouquet?
- You must answer exactly 12 out of 15 questions on a test. How many different ways can you select the questions to answer?
- A lab assigns a three-digit identification to each subject in an experiment. No two subjects have the same identification. No digit can be repeated in an identification. What is the greatest number of subjects that can be used in the experiment?
- To mark its eighth anniversary, Pizzeria Otto has a special coupon that offers the same price on a pizza with any combination of the 8 original toppings. Each pizza must have at least one topping. How many different kinds of pizza can be ordered with the coupon?

Lesson 11-2

- A class rolled a number cube 40 times and recorded an even number 23 times. What is the experimental probability of rolling an even number? odd number?

A card is chosen from a standard 52-card deck. Find each theoretical probability.

- | | | |
|----------------------|------------------------------|---------------------|
| 20. $P(\text{club})$ | 21. $P(4 \text{ of hearts})$ | 22. $P(\text{ace})$ |
|----------------------|------------------------------|---------------------|
- On a multiple-choice test, each item has 5 choices, but only one choice is correct. How can you simulate guessing each answer on a 20-question test?

Extra Practice (continued)

Chapter 11

24. To score a point in a certain party game, a thrown bean bag must land in a circle with a 2-foot diameter. If the playing field is a 10-foot by 12-foot rectangle, what is the probability that a bean bag that lands randomly in the playing field will score a point?

Lesson 11-3

Classify each pair of events as *dependent* or *independent*.

25. A number cube is rolled; the number cube is rolled again.
 26. A marble is chosen out of a bag; another remaining marble is chosen out of the bag.

Q and R are independent events. Find $P(Q \text{ and } R)$.

27. $P(Q) = \frac{1}{4}, P(R) = \frac{1}{8}$ 28. $P(Q) = \frac{2}{7}, P(R) = \frac{7}{9}$ 29. $P(Q) = 0.4, P(R) = 0.15$

Two fair number cubes are tossed. State whether the events are mutually exclusive. Explain your reasoning.

30. The sum is 10; the numbers are equal.
 31. The sum is greater than 9; one of the numbers is 2.

S and T are mutually exclusive events. Find $P(S \text{ or } T)$.

32. $P(S) = \frac{1}{6}, P(T) = \frac{2}{3}$ 33. $P(S) = \frac{7}{15}, P(T) = \frac{1}{5}$ 34. $P(S) = 18\%, P(T) = 44\%$

A fair number cube is tossed. Find each probability.

35. $P(6 \text{ or even})$ 36. $P(\text{even or more than } 1)$ 37. $P(\text{even or prime})$

Lesson 11-4

Use the table to find each probability.

38. $P(\text{counselor a junior})$
 39. $P(\text{counselor female})$
 40. $P(\text{counselor a senior and male})$
 41. $P(\text{counselor a junior} \mid \text{counselor female})$
 42. $P(\text{counselor male} \mid \text{counselor a senior})$

Characteristics of Comp Counselors

Grade Level	Male	Female
Junior	18	21
Senior	25	16

43. The probability that Luis wins the election for class president is $\frac{3}{5}$. The probability that Mac wins the election for class treasurer is $\frac{2}{3}$. The probability that both will win the office they are running for is $\frac{1}{2}$. What is the probability that Luis wins given that Mac wins?

Extra Practice (continued)**Chapter 11**

44. You toss two number cubes. The sum of the numbers is greater than 5. What is the probability that you tossed the same number on each cube?

Lesson 11-5

Determine whether the strategies described result in a fair decision. Explain.

45. The academic team has 12 players. The coach wants to pick 2 of the players as captains of the team. The coach writes each player's name on a piece of paper, places the names in a bag and chooses 2 at random.
46. Mrs. Jackson is a history teacher. To choose two students at random, she decides to choose the tallest and shortest students in the class.

Lesson 11-6

Find the mean, median, and mode of each set of values.

47. 3 2 6 4 5 3 4 2 7 5 3
48. 16 62 24 13 21 35 24 17 20
49. 125 135 126 138 137 135 121
50. 6.1 9.5 3.8 4.6 6.1 2.3 3.7 2.1
51. All the scores on an Advanced Algebra final exam are shown below.
- 59 62 63 63 72 74 74 78 79 81
- 83 84 84 84 89 90 92 94 96 98
- Find the mean, median, and mode for the data.
 - What percentile is the student who scored 89?
 - Draw a box-and-whisker plot for the data.
 - Identify any outliers in the data. Explain your choice.

Lesson 11-7

Find the mean, variance, and standard deviation for each data set.

52. 6 8 5 2 7 3 5 6 7
53. 25 29 21 19 30 26 28
54. 12 9 10 11 13 9 20
55. 100 98 101 100 102 97 100

Extra Practice (continued)

Chapter 11

Lesson 11-8

56. The school principal wants to find out how many students support starting a lacrosse team. The principal interviews students at random as they watch a soccer game. What sampling method was used? Identify any bias in the method.
57. The mayor of your town is running for re-election. What sampling method could you use to find the percent of registered voters in your town who plan to re-elect the mayor? What is an example of a survey question that is likely to yield unbiased information?

Lesson 11-9

Find the probability of x successes in n trials for the given probability of success p on each trial.

58. $x = 2, n = 6, p = 0.7$ 59. $x = 3, n = 8, p = \frac{2}{5}$ 60. $x = 9, n = 10, p = 0.3$
61. $x = 7, n = 9, p = \frac{1}{5}$ 62. $x = 4, n = 12, p = 0.8$ 63. $x = 8, n = 11, p = 0.9$

Use the binomial expansion of $(p + q)^n$ to calculate each binomial distribution.

64. $n = 5, p = 0.2$ 65. $n = 6, p = 0.4$ 66. $n = 5, p = 0.7$

67. Jean is visiting her grandparents in Houston for five days. She wants to arrange a lunch with friends. If she picks a day at random, there is a 20% chance that all of her friends will be available to meet for lunch. What is the probability that all her friends are available to meet for lunch on three different days?

Lesson 11-10

Sketch a normal curve for each distribution. Label the x -axis values at one, two, and three standard deviations from the mean.

68. mean = 30, standard deviation = 4 69. mean = 45, standard deviation = 11

70. The mean score on a quiz is 82 out of 100 possible points and the standard deviation is 4. Estimate the percent of scores that were 90 or higher.
71. A psychology professor gives a 100-item true/false test in a large college class. The mean score is 75.2, and the standard deviation is 8.1. The scores follow a normal distribution. What is the minimum score that is in the 99th percentile?

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