

Practice

For use with pages 647C–647D

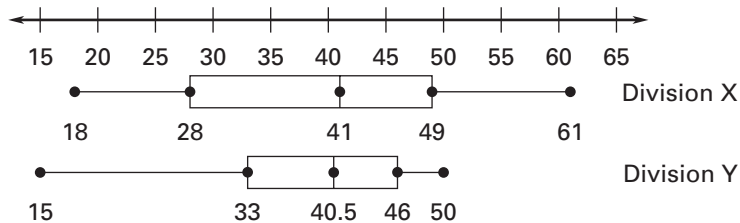
- 1. Grades** The table shows the grades (in percentages) of two students for 11 randomly selected biology assignments. Use a measure of central tendency to draw a conclusion about the data. Explain your reasoning.

Student A	84	82	73	91	58	80	73	90	78	75	94
Student B	88	86	90	88	70	78	77	88	80	75	96

- 2. Grocery store** The table shows the prices (in dollars) for 8 randomly selected items in two grocery stores. Use a measure of central tendency to draw a conclusion about the data. Explain your reasoning.

Store A	1.29	3.59	4.68	2.35	2.00	8.49	1.87	1.99
Store B	0.99	3.00	4.59	2.50	1.75	8.29	2.00	1.89

- 3. Business** The box-and-whisker plots show the monthly sales (in thousands of dollars) within two divisions of a company. The table shows the data that are represented by the box-and-whisker plots.



Division X	22	18	26	36	45	30	37	47	46	51	53	61
Division Y	30	15	27	37	40	36	41	45	42	47	49	50

- a.** Use a measure of central tendency to draw a conclusion about the data. Explain your reasoning.
- b.** Use a measure of dispersion to draw a conclusion about the data. Explain your reasoning.
- 4. Challenge** A juice company is planning to launch a new flavor. The table shows the results of a taste test of 20 random consumers. Each consumer rated three different flavors using a scale from 1 (did not like) to 10 (liked very much).

Very Cherry	2	5	3	7	5	2	2	1	5	6	3	7	7	3	4	1	4	7	8	4
Orange Mango	5	3	6	3	9	10	7	3	3	8	4	7	2	6	6	4	6	3	7	8
Berry Grape	10	7	9	6	10	8	5	5	9	4	8	5	5	5	8	9	3	4	5	3

Use a measure of central tendency to decide which juice flavor will win the taste test. Explain your reasoning.

11.6**Practice**

For use with pages 649–653

1. List all the permutations of the numbers 1, 2, and 3.

2. $6! = \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad}$

Match the expression with its value

3. $4!$

4. ${}_4P_1$

5. $0!$

6. ${}_4P_2$

A. 1

B. 12

C. 4

D. 24

Evaluate the factorial.

7. $(4 - 1)!$

8. $(10 - 4)!$

9. $(17 - 12)!$

10. $(12 - 4)!$

Find the number of permutations.

11. ${}_5P_0$

12. ${}_6P_2$

13. ${}_{20}P_1$

14. ${}_7P_3$

15. ${}_7P_7$

16. ${}_8P_4$

17. ${}_{21}P_3$

18. ${}_{14}P_6$

Write the expression using factorials.

19. $21 \cdot 20 \cdot 19$

20. 45

21. $11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4$

22. $53 \cdot 52 \cdot 51 \cdot 50$

23. Ten cyclists enter a race. In how many ways can they finish first, second, and third?

24. A company's security system uses a code consisting of 5 different digits. Your security code has the digits 8, 2, 9, 0, and 3, but you don't remember the order in which the 5 digits are to be entered. Find the probability that you enter the correct code on the first try.

25. In how many ways can 5 children line up in one row to have their picture taken?

26. You have 12 CDs and choose 4 of them to play one evening. How many orders of CDs are possible for playing the 4 CDs?

11.7**Practice**

For use with pages 654–659

1. To find the number of combinations of n objects taken r at a time, divide the number of ___?___ of n objects taken r at a time by ___?___.

Find the number of combinations.

- | | | | |
|---------------|-----------------|------------------|---------------------|
| 2. ${}_4C_1$ | 3. ${}_3C_3$ | 4. ${}_5C_3$ | 5. ${}_7C_2$ |
| 6. ${}_9C_8$ | 7. ${}_{14}C_0$ | 8. ${}_{12}C_4$ | 9. ${}_{13}C_{12}$ |
| 10. ${}_8C_6$ | 11. ${}_9C_3$ | 12. ${}_{15}C_2$ | 13. ${}_{14}C_{10}$ |

In Exercises 14–16, tell whether the possibilities can be counted using permutations or combinations. Then answer the question.

14. A media research firm conducts a survey of television viewers and asks them to state their favorite show and least favorite show from a list of 15 shows. How many possible responses are there?
15. The manager of an engineering department wants to form a three-person advisory committee from the 18 employees in the department. How many different groups can the manager form?
16. There are 4 processes involved in assembling a certain product. These processes can be performed in any order. Management wants to find which order is the least time consuming. How many orders will have to be tested?
17. A company wants to send 3 of its 10 sales representatives to a conference. How many different groups can the company choose?
18. A state government is planning a new section of highway and has received bids from 16 construction companies. The state needs 5 of the companies. How many different groups of 5 companies can the state choose?
19. A jury consists of 8 men and 4 women. Four jurors are selected at random for an interview. How many different groups of 4 jurors are there? Find the probability that all 4 jurors chosen are women.

11.8

Practice

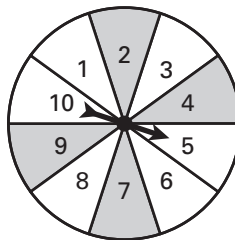
For use with pages 661–666

Complete the statement.

- If A and B are disjoint events, then $P(A \text{ or } B) = \underline{\quad? \quad}$.
- If A and B are overlapping events, then $P(A \text{ or } B) = \underline{\quad? \quad}$.
- The sum of the probabilities of complementary events is always $\underline{\quad? \quad}$.
- If you know the probability of an event A, then the probability of the complementary event, *not* A, is given by $P(\text{not } A) = \underline{\quad? \quad}$.

The spinner is divided into equal parts. For the specified events A and B, tell whether the events are *disjoint* or *overlapping*. Then find $P(A \text{ or } B)$.

- Event A:** Stops on an even number.
Event B: Stops on a shaded sector.
- Event A:** Stops on a shaded sector.
Event B: Stops on a multiple of 5.



Events A and B are disjoint. Find $P(A \text{ or } B)$.

$$7. P(A) = \frac{3}{14}, P(B) = \frac{9}{14}$$

$$8. P(A) = \frac{11}{42}, P(B) = \frac{13}{42}$$

Events A and B are overlapping. Find $P(A \text{ or } B)$.

$$9. P(A) = \frac{7}{20}, P(B) = \frac{9}{20}, P(A \text{ and } B) = \frac{3}{20}$$

$$10. P(A) = \frac{1}{4}, P(B) = \frac{1}{3}, P(A \text{ and } B) = \frac{5}{24}$$

Given $P(A)$, find $P(\text{not } A)$.

$$11. P(A) = 27\%$$

$$12. P(A) = 89\%$$

$$13. P(A) = \frac{9}{26}$$

$$14. P(A) = \frac{13}{41}$$

In Exercises 15–17, use the following information. At a college, 51% of the students are women, 25% of the students are business majors, 5% have not chosen a major, and 12% are women and business majors. A student newspaper conducts a poll and selects students at random to answer a survey.

- What is the probability that a randomly selected student will be either a woman or a business major?
- What is the probability that a randomly selected student is not a business major?
- What is the probability that a randomly selected student is either a business major or has not chosen a major?

11.9

Practice

For use with pages 668–673

Complete the statement.

- If A and B are independent events, then $P(A \text{ and } B) = \underline{\quad? \quad}$.
- If A and B are dependent events, then $P(A \text{ and } B) = \underline{\quad? \quad}$.

Events A and B are independent. Find the missing probability.

3. $P(A) = \frac{2}{5}$

4. $P(A) = \frac{3}{8}$

$P(B) = \frac{1}{6}$

$P(B) = \frac{4}{9}$

$P(A \text{ and } B) = \underline{\quad? \quad}$

$P(A \text{ and } B) = \underline{\quad? \quad}$

Events A and B are dependent. Find the missing probability.

5. $P(A) = \frac{6}{11}$

6. $P(A) = \frac{8}{15}$

$P(B \text{ given } A) = \frac{1}{2}$

$P(B \text{ given } A) = \frac{5}{14}$

$P(A \text{ and } B) = \underline{\quad? \quad}$

$P(A \text{ and } B) = \underline{\quad? \quad}$

In Exercises 7 and 8, tell whether the events are *independent* or *dependent*. Then find $P(A \text{ and } B)$.

- You randomly choose a marble from a bag of 8 green marbles and 5 blue marbles. You randomly draw another marble without replacing the first marble.

Event A: You draw a blue marble.**Event B:** You draw a blue marble.

- A weather forecaster says that there is a 25% chance of rain today and a 55% chance of rain tomorrow.

Event A: It rains today.**Event B:** It rains tomorrow.

- Each week you have a surprise quiz in your social studies and science classes. Find the probability that both quizzes will be given on the same day next week.
- A printing company's bookbinding machine has a probability of 0.5% of producing a defective book. If this machine is used to bind 3 books, find the probability that none of the books are defective. Round your answer to the nearest tenth of a percent.
- Twelve light bulbs are tested to see if they last as long as the manufacturer claims they do. Three light bulbs fail the test. Two light bulbs are selected at random without replacement.
 - Find the probability that both light bulbs failed the test.

Practice

For use with pages 687–691

Tell whether the angles are **complementary**, **supplementary**, or **neither**.

1. $m\angle 1 = 26.5^\circ$
 $m\angle 2 = 63.5^\circ$

2. $m\angle 3 = 108.2^\circ$
 $m\angle 4 = 61.8^\circ$

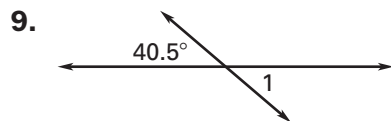
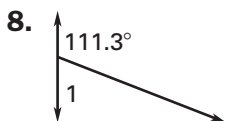
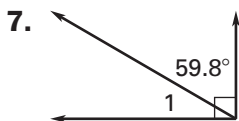
3. $m\angle 5 = 32.1^\circ$
 $m\angle 6 = 67.9^\circ$

4. $m\angle 7 = 98.7^\circ$
 $m\angle 8 = 81.3^\circ$

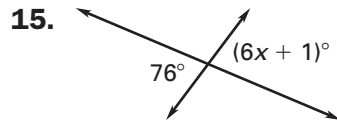
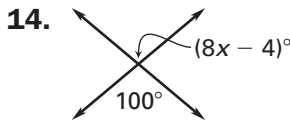
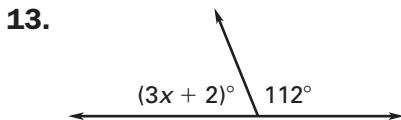
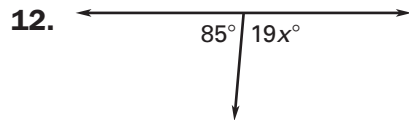
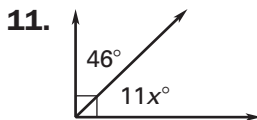
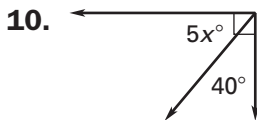
5. $m\angle 9 = 41.2^\circ$
 $m\angle 10 = 58.8^\circ$

6. $m\angle 11 = 27.5^\circ$
 $m\angle 12 = 152.5^\circ$

Find $m\angle 1$.



Find the value of x . Then find the unknown angle measure.



Use the given information to find $m\angle 2$.

16. $\angle 1$ and $\angle 2$ are complementary angles, and $m\angle 1 = 19.5^\circ$.

17. $\angle 1$ and $\angle 2$ are supplementary angles, and $m\angle 1 = 87.9^\circ$.

18. $\angle 1$ and $\angle 2$ are vertical angles, and $m\angle 1 = 45.6^\circ$.

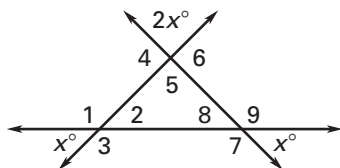
In the diagram, write an expression in terms of x for the indicated angle.

19. $m\angle 1$

20. $m\angle 4$

21. $m\angle 5$

22. $m\angle 8$



23. On the map, Elm Road intersects both Main Street and South Avenue. $\angle 1$ and $\angle 3$ are complementary angles and $m\angle 2 = 140.5^\circ$. Find $m\angle 1$, $m\angle 3$, and $m\angle 4$.

