

**LESSON  
6.1****Practice***For use with the lesson "Use Combinations and the Binomial Theorem"***Find the number of combinations.**

1.  ${}_6C_4$

2.  ${}_8C_5$

3.  ${}_7C_3$

4.  ${}_9C_7$

5.  ${}_{13}C_9$

6.  ${}_{10}C_6$

7.  ${}_{12}C_8$

8.  ${}_{14}C_{10}$

**Find the number of possible 5-card hands that contain the cards specified.  
The cards are taken from a standard 52-card deck.**

9. 5 red cards

10. 4 spades and 1 card that is not a spade

11. 3 face cards (kings, queens, or jacks) and 2 cards that are not face cards

12. 2 aces and 3 cards that are not aces

13. At most 1 diamond

14. At least 1 king

**Use the binomial theorem to write the binomial expansion.**

15.  $(x - 2)^4$

16.  $(x + 3)^3$

17.  $(2x + 5)^5$

18.  $(4x - 1)^6$

19.  $(x + 6y)^3$

20.  $(x - 5y)^5$

21.  $(3x - y)^6$

22.  $(8x + y)^4$

**LESSON**  
**6.1****Practice** *continued**For use with the lesson "Use Combinations and the Binomial Theorem"*

- 23.** Find the coefficient of  $x^6$  in the expansion of  $(2x + 3)^{10}$ .
- 24.** Find the coefficient of  $x^4$  in the expansion of  $(3x - 1)^{11}$ .
- 25.** Find the coefficient of  $x^7$  in the expansion of  $(2x - 5)^9$ .
- 26.** Find the coefficient of  $x^3$  in the expansion of  $(3x + 2)^{12}$ .
- 27. School Musical** A teacher is holding tryouts for the school musical. There are 15 students trying out for 7 identical chorus parts. In how many ways can the teacher select the chorus members?
- 28. Soccer Starters** A youth indoor soccer team has 6 starting players. The starting players must consist of 3 boys and 3 girls. There are 7 boys and 6 girls on the team. Each player can play each position. In how many ways can the coach select players to start the game?
- 29. Football Cards** You have a plastic sheet that holds 9 trading cards. You want to fill the sheet with football cards consisting of 4 quarterbacks, 3 running backs, and 2 wide receivers. In your collection of cards, you have 10 quarterbacks, 7 running backs, and 8 wide receivers. In how many different ways can you select the cards?

**LESSON**  
**6.2****Practice***For use with the lesson "Construct and Interpret Binomial Distributions"*

**Calculate the probability of tossing a coin 25 times and getting the given number of heads.**

1. 2                                      2. 10                                      3. 18                                      4. 25

**Calculate the probability of randomly guessing the given number of correct answers on a 20-question multiple choice exam that has choices A, B, C, and D for each question.**

5. 10                                      6. 8                                      7. 18                                      8. 5

**Calculate the probability of  $k$  successes for a binomial experiment consisting of  $n$  trials with probability  $p$  of success on each trial.**

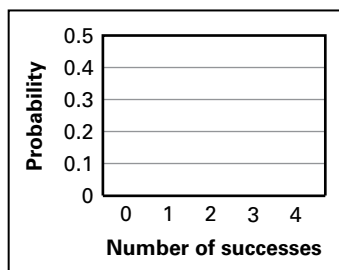
9.  $k \geq 4, n = 8, p = 0.16$                                       10.  $k \leq 5, n = 10, p = 0.45$

11.  $k \geq 3, n = 5, p = 0.34$                                       12.  $k \leq 8, n = 12, p = 0.60$

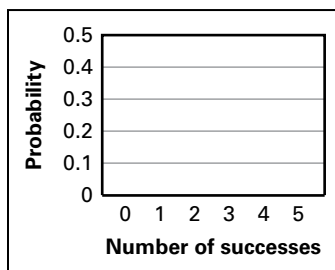
LESSON  
6.2**Practice** *continued**For use with the lesson "Construct and Interpret Binomial Distributions"*

**A binomial experiment consists of  $n$  trials with probability  $p$  of success on each trial. Draw a histogram of the binomial distribution that shows the probability of exactly  $k$  successes. Describe the distribution as either symmetric or skewed. Then find the most likely number of successes.**

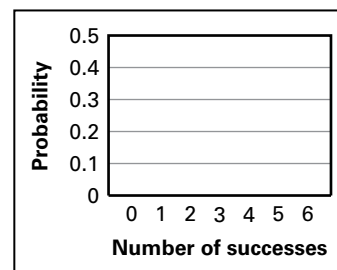
13.  $n = 4, p = 0.45$



14.  $n = 5, p = 0.75$



15.  $n = 6, p = 0.83$



**In Exercises 16 and 17, use the following information.**

**Puppies** A registered golden retriever has a litter of 11 puppies. Assume that the probability of a puppy being male is 0.5.

16. Because the owner of the dog can expect to get more money for a male puppy, what is the most likely number of males in the litter?
17. What is the probability at least 7 of the puppies will be male?

**LESSON**  
**6.3**

# Practice

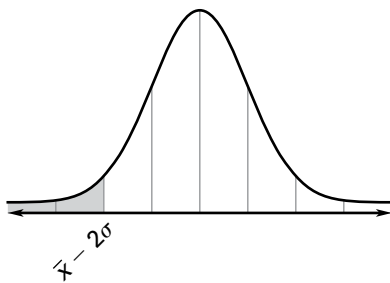
For use with the lesson "Use Normal Distributions"

**A normal distribution has mean  $\bar{x}$  and standard deviation  $\sigma$ . Find the indicated probability for a randomly selected  $x$ -value from the distribution.**

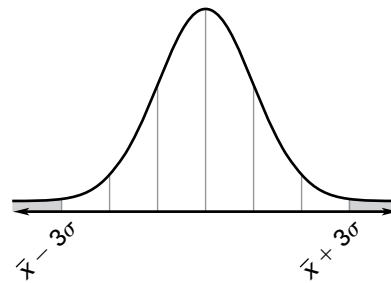
1.  $P(x \geq \bar{x} + \sigma)$                       2.  $P(x \leq \bar{x} + 2\sigma)$                       3.  $P(x \geq \bar{x} - 3\sigma)$

**Give the percent of the area under the normal curve represented by the shaded region.**

4.



5.



**A normal distribution has a mean of 27 and a standard deviation of 5. Find the probability that a randomly selected  $x$ -value from the distribution is in the given interval.**

6. Between 22 and 32                      7. Between 12 and 27                      8. Between 17 and 37
9. At least 22                                  10. At least 37                                  11. At most 32

**LESSON**  
**6.3****Practice** *continued*  
*For use with the lesson "Use Normal Distributions"*

**A normal distribution has a mean of 75 and a standard deviation of 10. Use the standard normal table on page 759 of your textbook to find the indicated probability for a randomly selected  $x$ -value from the distribution.**

12.  $P(x \leq 70)$

13.  $P(x \leq 52)$

14.  $P(x \leq 78)$

15.  $P(x \leq 96)$

16.  $P(x \leq 44)$

17.  $P(x \leq 106)$

18. **Biology** The weights of adult male rhesus monkeys are normally distributed with a mean of 17 pounds and a standard deviation of 3 pounds. What is the probability that a randomly selected adult male rhesus monkey has a weight less than 14 pounds?

**In Exercises 19 and 20, use the following information.**

**Apples** The annual per person consumption of apples in the United States is normally distributed with a mean of 16 pounds and a standard deviation of 4 pounds.

19. Find the  $z$ -score for an annual per person consumption of 22 pounds.
20. What is the probability that a randomly selected person in the United States has an annual per person consumption of apples less than 22 pounds?

**LESSON  
6.4****Practice***For use with the lesson "Select and Draw Conclusions from Samples"***Identify the type of sample described. Then tell if the sample is biased.****Explain your reasoning.**

1. A consumer advocacy group wants to know if car owners believe their car is reliable. The group randomly selects 1020 car owners and mails out a survey to each one.
2. A grocery store wants to know which day of the week consumers prefer to do their grocery shopping. Everyone who shops at the store on Friday is asked which day of the week they prefer to do their grocery shopping.
3. A survey of students' favorite school subjects is being conducted. Every other student in the math club is asked "Which school subject is your favorite?"

**Find the margin of error for a survey that has the given sample size.****Round your answer to the nearest tenth of a percent.**

- |         |        |         |          |
|---------|--------|---------|----------|
| 4. 200  | 5. 350 | 6. 1100 | 7. 2600  |
| 8. 5200 | 9. 495 | 10. 280 | 11. 9000 |

**Find the sample size required to achieve the given margin of error.****Round your answer to the nearest whole number.**

- |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|
| 12. $\pm 2\%$   | 13. $\pm 4\%$   | 14. $\pm 9.5\%$ | 15. $\pm 2.7\%$ |
| 16. $\pm 4.5\%$ | 17. $\pm 0.5\%$ | 18. $\pm 3.6\%$ | 19. $\pm 7.5\%$ |

**LESSON**  
**6.4****Practice** *continued**For use with the lesson "Select and Draw Conclusions from Samples"***In Exercises 20 and 21, use the following information.**

**Technology Survey** In a survey of 504 people in the United States, about 11% said that the influx of new technologies such as computers has left them feeling overwhelmed.

- 20.** What is the margin of error for the survey? Round your answer to the nearest tenth of a percent.
- 21.** Give an interval that is likely to contain the exact percent of all people in the United States who feel overwhelmed by the influx of new technologies.

**In Exercises 22–25, use the following information.**

**TV in the Bedroom** A survey reported that 510 kids ages 8 to 18, or 68% of those surveyed, have a TV in their bedroom.

- 22.** How many kids ages 8 to 18 were surveyed?
- 23.** What is the margin of error for the survey? Round your answer to the nearest tenth of a percent.
- 24.** Give an interval that is likely to contain the exact percent of all kids ages 8 to 18 who have a TV in their bedroom
- 25.** About how many kids ages 8 to 18 should be surveyed to have a margin of error of 2.5%?



**LESSON  
6.5****Practice**

*For use with the lesson "Compare Surveys, Experiments, and Observational Studies"*

**Tell why the question may be biased or otherwise introduce bias into the survey. Describe a way to correct the flaw.**

1. "Don't you agree that replacing the old chairs in our school's auditorium with comfortable new chairs will make the auditorium even better?"
  
  
  
  
  
  
  
  
  
  
2. "Do you support the mayor's tax proposal?"
  
  
  
  
  
  
  
  
  
  
3. A fireman asks students, "Do you have smoke detectors in every room in your house?"

**Determine whether each situation is an example of an *experiment* or an *observational study*. Explain.**

4. A professional painter wants to determine whether a paint additive will eliminate brush and roller marks on walls. She paints 2 walls with the additive and 2 walls without the additive without knowing which paint contains the additive.
  
  
  
  
  
  
  
  
  
  
5. A veterinarian studies the effectiveness of a flea-and-tick protection that is applied to dogs once a month by monitoring 50 randomly selected dogs that already use the protection and 50 randomly selected dogs that do not use the protection.

**LESSON  
6.5****Practice** *continued*

*For use with the lesson "Compare Surveys, Experiments, and Observational Studies"*

6. Determine whether the study described in the report at the right is a randomized comparative experiment. If it is, describe the treatment, the treatment group, and the control group. If it is not, explain why not and explain whether the conclusions drawn from the study are valid.

**Racing Cyclists Prefer Disc Wheels**

A recent study by a bicycle wheel manufacturer shows that disc wheels are more aerodynamic than regular spoked wheels. The study observed 75 randomly selected cyclists who rode bicycles with disc wheels in a wind tunnel and 75 randomly selected cyclists who rode bicycles with spoked wheels in a wind tunnel. The cyclists using disc wheels had less drag 83% of the time.

**Explain whether the research topic is best addressed through an *experiment* or an *observational study*. Then explain how you would design the experiment or the observational study.**

7. You want to know if students in your class will finish their math homework faster if they are allowed to use calculators.
8. You want to know if grocery stores in the city have higher prices than grocery stores in suburbs of the city.
9. Describe how you would set up a randomized comparative experiment to investigate the hypothesis below. Include any precautions you would take to ensure that your conclusions are valid.

*Applying an anti-reflective coat to your eyeglasses will reduce the glare you see.*