Chapter 11 Quiz 1
Lessons 11–1 through 11–5

Do you know HOW?
Evaluate each expression.

1. \( \frac{4}{2} \) \( \binom{2}{1} = 12 \)
2. \( \frac{14}{5} \) \( \binom{5}{4} = 240 \)
3. \( \frac{7}{4} \) \( \binom{4}{3} = 35 \)

4. You got an A on 6 of your last 18 quizzes. What is the experimental probability that you will get an A on your next quiz? \( \approx 0.33 \text{ or } 33\% \)

5. A jar holds 6 blue blocks, 8 red blocks, 10 green blocks, 2 yellow blocks, and 4 black blocks. If a block is taken from the jar at random, what is the theoretical probability that it will be blue? \( 0.2 \text{ or } 20\% \)

For Exercises 6 and 7, classify each pair of events as independent or dependent.

6. A card is randomly chosen from a deck; another card is randomly chosen from the remaining cards. dependent

7. A fair number cube is rolled; a card is randomly chosen from a deck. independent

8. A number from 1 to 25 is randomly chosen. What is the probability that the number chosen is a multiple of 4, given that the number is even? \( 0.5 \text{ or } 50\% \)

9. The organizer of a basketball tournament wants to determine which 2 of the 8 teams will play first. She assigns each team a number from 1 to 8, and then spins a spinner with equal sections numbered 1 to 8. The first two different numbers she spins are used to pick the two teams chosen. Does this strategy result in a fair decision? Explain. Yes; each team has the same chance of being chosen.

Do you UNDERSTAND?

10. Reasoning When using a simulation, are you finding the experimental probability or the theoretical probability of an event? Why? Answers may vary.
Sample: You are finding the experimental probability. When you simulate an event, you use the data from that simulation (experiment) to calculate probability.

11. Writing Explain why the probability of two mutually exclusive events occurring at the same time is zero.
Answers may vary. Sample: Mutually exclusive events are events that cannot happen at the same time. If they cannot happen, then the probability is zero.
Chapter 11 Quiz 2

Lessons 11–6 through 11–10

Do you know HOW?

Find each measure for the following data set.

<table>
<thead>
<tr>
<th>Top Wind Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (mph)</td>
</tr>
<tr>
<td>Mon 19</td>
</tr>
<tr>
<td>Tue 23</td>
</tr>
<tr>
<td>Wed 14</td>
</tr>
<tr>
<td>Thu 16</td>
</tr>
<tr>
<td>Fri 23</td>
</tr>
</tbody>
</table>

1. mean 19  
2. median 23
3. mode 19

Find each measure for the following data set.

<table>
<thead>
<tr>
<th>Pounds of Trash Produced Each Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trash (lb)</td>
</tr>
<tr>
<td>Week 1 16</td>
</tr>
<tr>
<td>Week 2 12</td>
</tr>
<tr>
<td>Week 3 22</td>
</tr>
<tr>
<td>Week 4 13</td>
</tr>
<tr>
<td>Week 5 15</td>
</tr>
<tr>
<td>Week 6 18</td>
</tr>
</tbody>
</table>

4. mean 16  
5. variance 11
6. standard deviation $\approx 3.32$

7. A local newspaper places an ad in the paper asking readers to phone in and name their favorite section of the newspaper. Identify the sampling method used in this situation. Then identify any bias in the method. Self-selected sample; Answers may vary. Sample: The sample consists only of people who volunteer to participate, so the opinions of the population may not be completely represented.

Expand each binomial.

8. $(x + y)^4 = x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$
9. $(2m + n)^3 = 8m^3 + 12m^2n + 6mn^2 + n^3$
10. $(x + 2y)^5 = x^5 + 10x^4y + 40x^3y^2 + 80x^2y^3 + 80xy^4 + 32y^5$

Do you UNDERSTAND?

11. In a cooler, 40% of the drinks are sugar-free. Someone grabs 4 drinks without looking. What is the probability that at least 2 of the drinks are sugar-free? $\approx 0.52$

12. A baseball team is reviewing their batting statistics. The mean number of hits for the batters on the team is 124, and the standard deviation is 14.5. What percent of the batters have between 95 and 124 hits? 47.5%
Chapter 11 Test

Do you know HOW?

1. Your brother is ordering 5 pizzas for the family. There are 18 different kinds of pizza. How many different ways could he order 5 different kinds of pizzas? **8568 ways**

A box contains 8 blueberry muffins, 6 banana muffins, and 4 pumpkin muffins. You pick one muffin from the box at random. Find each theoretical probability.

2. \( P(\text{banana}) \quad \frac{1}{3} \)  
3. \( P(\text{not pumpkin}) \quad \frac{7}{9} \)  
4. \( P(\text{banana or pumpkin}) \quad \frac{5}{9} \)

5. \( J \) and \( K \) are independent events. \( P(J) = \frac{1}{4} \) and \( P(K) = \frac{2}{3} \). Find \( P(J \text{ and } K) \). **\( \frac{1}{6} \)**

6. A company is testing a new sunscreen to see if it is more likely to cause skin irritation that the sunscreen it currently sells. The results of the test are shown in the contingency table.

<table>
<thead>
<tr>
<th>Skin irritation</th>
<th>No skin irritation</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used new sunscreen</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>Used current sunscreen</td>
<td>3</td>
<td>37</td>
</tr>
<tr>
<td>Totals</td>
<td>5</td>
<td>75</td>
</tr>
</tbody>
</table>

The company decides to make and sell the new sunscreen. Based on the results of the test, did the company make a good decision? Explain. **Answers may vary. Sample: Yes; about 2 out of 40 people who use the new sunscreen have skin irritation, compared to about 3 out of 40 people who use the current sunscreen. Based on this study, the new sunscreen is no more likely to cause skin irritation than the current sunscreen, so the company made a good decision.**

For Exercises 7 and 8, use the following data set: 27 35 32 25 36.

7. Find the mean, variance, and standard deviation for the data set.  
   **31; 18.8; \approx 4.85**

8. Within how many standard deviations of the mean do all of the data values fall? **All of the values fall within 2 standard deviations of the mean.**
9. A team of biologists is studying the foxes in a state forest. The team captures 4 foxes, weighs them, and then releases them. Which type of study method is described in this situation? Should the sample statistics be used to make a general conclusion about the population? **Observational study; Answers may vary: Sample:** The sample size may be too small for the sample statistics to be reliable as a general conclusion.

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

10. \( x = 4, n = 9, p = 0.3 \)  
   \[ \approx 0.17 \]

11. \( x = 7, n = 12, p = 0.6 \)  
   \[ \approx 0.23 \]

12. \( x = 2, n = 7, p = 0.5 \)  
   \[ \approx 0.16 \]

13. A set of data has a normal distribution with a mean of 36 and a standard deviation of 4. What percent of the data are within the interval from 32 to 40? **About 68%**

**Do you UNDERSTAND?**

14. An alumni association compiled the following information about its recent graduates.
   - 20% graduated with a B average or better
   - 95% of those students who graduated with a B average or better were employed within 6 months of graduation
   - 50% of those that graduated with less than a B average were employed within 6 months of graduation

   a. What is the probability that someone is employed within 6 months of graduation, given that he had less than a B average? **0.50 or 50%**
   b. What is the probability that someone is not employed within 6 months of graduation, given that she had a B average or better? **0.05 or 5%**

15. Make a box-and-whisker plot for this set of values: 10 7 12 8 18 12 10 16.

   ![Box-and-Whisker Plot]

16. **Reasoning** On a history test, there were 12 As, 8 Bs, 6 Cs and 1 D. Are the numerical scores on the test likely to be normally distributed? Explain. **No; there are more As than any other test grade, so there are more high scores than low scores. The data are likely skewed rather than normally distributed.**