

LESSON **Algebra Lab Recording Sheet** pp. 734–735
10-7 **Compound Events**

Try This

Activity 1

Suppose you are playing Monopoly and are “just visiting” the Jail. If you roll 7 on your next turn, you will land on Community Chest. If you roll 12, you will land on Chance. What is the probability that on your next roll you land on either Community Chest or Chance?

You cannot land on Community Chest and Chance at the same time, so the events are mutually exclusive. You cannot roll 7 and 12 at the same time, so those events are also mutually exclusive.

The table shows some of the totals when rolling two fair dice. Copy and complete the table. Use one color to circle all rolls with a total of 7. Use a second color to circle all rolls with a total of 12.

+	1	2	3	4	5	6
1	2	3	4	5		
2	3	4				
3	4	5				
4	5					
5	6					
6	7					

Try This

1. What is the total number of possible rolls? _____
2. What is the probability that the total will be 7? _____
3. What is the probability that the total will be 12? _____
4. What is the probability that the total will be 7 or 12? _____
5. What do you notice about the probabilities in Problems 2, 3, and 4?

Suppose you are three spaces away from Community Chest and eight spaces away from Chance.

6. What is the probability that on your next roll the total will be 3? _____
7. What is the probability that on your next roll the total will be 8? _____
8. What is the probability that on your next roll the total will be 3 or 8? _____
9. Complete the following statement:
 The probability that one of two mutually exclusive events will occur is the _____ of the probabilities of the individual events.

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10-7 **Compound Events** continued

In this lab, you discovered this rule: If A and B are mutually exclusive events, then $P(A \text{ or } B) = P(A) + P(B)$.

Activity 2

Suppose you are playing Yahtzee and on the last roll of your turn, you roll two of the five dice. You need to roll either a 1 or a 5 to make what is called a “small straight” (four consecutive numbers).



What is the probability that you will make a small straight? _____

You can roll a 1 and a 5 at the same time on different dice. These events are inclusive. (If you roll a 1 and a 5, you will need to look at only four of the dice to make a small straight.)

Case 1	Case 2	Case 3
At least one 1	At least one 5	Both a 1 and a 5

Try This



10. Find the probability of Case 1, rolling at least one 1.

a. What is the probability of rolling \square on the first die and any number on the second die?

b. What is the probability of rolling any number on the first die and \square on the second die?







c. What is the probability rolling \square on the first die and \square on the second die?

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- d. Parts a and b both include rolling  on the first die and  on the second die. You need to count this outcome only once, so subtract the probability from part c from the sum of parts a and b.
- _____

11. Find the probability of Case 2, rolling at least one 5. (Hint: Repeat the steps in Problem 1.)
- _____

12. Find the probability of Case 3, rolling a 1 and a 5.
- _____

13. The probability of rolling a small straight, is the probability of rolling  or . Subtract the probability of rolling both  and  from the sum of the probabilities of rolling  on one of the dice (Problem 1) and rolling  on one of the dice (Problem 2).
- _____

14. Complete the following statement:

The probability that one of two inclusive events will occur is the _____ of the probabilities of the individual events _____ the probability of the intersection of the two events.

In this lab, you discovered this rule:

If A and B are inclusive events, then $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$.

LESSON Algebra Lab

10-7 Experimenting with Independent and Dependent Events

Use with Lesson 10-7

Materials needed: empty container, 3 black marbles, 4 blue marbles, 5 white marbles, and 6 red marbles

Activity

Place all of the marbles into the container. Randomly choose a marble, record the color, and then place the marble back into the container. Choose another marble and record its color. Then repeat the process again. Complete the table with your results.

	Color of Marble First Pick	Color of Marble Second Pick
1		
2		
3		
4		

Now, find the probability of choosing one colored marble from a container of marbles, putting the marble back in the box, and then choosing the same second marble. Complete the table.

	First Pick		Second Pick		Probability of choosing one of each type of marble = $P(\text{First Pick}) \cdot P(\text{Second Pick})$
	Total number of marbles in the box	Number of each type of marble	Total number of marbles in the box	Number of each type of marble	
Black	18		18		$\frac{3}{18} \cdot \frac{3}{18} = \frac{9}{324} = \frac{1}{36}$
Blue	18		18		
White	18		18		
Red	18		18		

LESSON **Algebra Lab**

10-7 **Experimenting with Independent and Dependent Events** continued

1. Did the probability of choosing the second marble, depend on the probability of choosing the first marble? _____

Explain. _____

2. How does the probability compare with your findings?

Activity 2

Place all of the marbles into the container. Randomly choose a marble, record the color, and then do NOT place the marble back into the container. Randomly choose another marble and record the color. Repeat this process 4 times. Complete the table with your results.

	Color of Marble First Pick	Color of Marble Second Pick
1		
2		
3		
4		

Now, find the probability of choosing one colored marble, keeping the marble out of the box, and then choosing the same second marble.

	First Pick		Second Pick		Probability of choosing one of each type of marble = $P(\text{First Pick}) \cdot P(\text{Second Pick})$
	Total number of marbles in the box	Number of each type of marble	Total number of marbles in the box	Number of each type of marble	
Black	18		17		$\frac{3}{18} \cdot \frac{2}{17} = \frac{1}{51}$
Blue	18		17		
White	18		17		
Red	18		17		

LESSON **Algebra Lab**

10-7 *Experimenting with Independent and Dependent Events* continued

1. Did the probability of choosing the second marble, depend on the probability of choosing the first marble? _____

Explain. _____

2. How does the probability compare with your findings?

Try This

Determine if each event is dependent or independent. Then find each probability.

1. $P(\text{choosing a red marble, keeping the marble, and choosing a black marble})$

2. $P(\text{choosing a red marble, putting the marble back, and choosing a black marble})$

3. $P(\text{choosing a blue marble, keeping the marble, and choosing a white marble})$

4. $P(\text{choosing a white marble, keeping the marble, choosing a white marble, keeping the marble, and choosing a white marble})$

5. $P(\text{choosing a blue marble, putting the marble back, choosing a blue marble, putting the marble back, and then choosing a blue marble})$

6. **Critical Thinking** Does the probability of picking a red marble out of the bag increase or decrease when you do not replace the marble after the first pick? Explain.

