# lesson twenty-five - student resource sheet

**Lesson Objective:** Predict outcomes using probability.

## Vocabulary Box

**probability** — For an experiment, the total number of successful events divided by the total number of possible events. Example: The probability of flipping heads on one try, or event, using a quarter is $\frac{1}{2}$.

**independent events** — Two events in which the outcome of the second is not affected by the outcome of the first. Example: The outcome of flipping heads on a quarter does not affect the outcome of flipping heads on a penny.

**dependent events** — Two events in which the outcome of the second is influenced by the outcome of the first. Example: In a drawer containing two pens and three pencils, the probability of taking out a pen at random is $\frac{2}{5}$. Once that pen is removed, the probability of taking out another pen at random changes to $\frac{1}{4}$.

## Independent Practice

Directions: Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work and your answers are in simplest form.

**I.** Use the letters of the English alphabet to find the following probabilities. Assume all choices are random.

1. Choosing a vowel.

2. Choosing the letter *Q*.

3. Choosing a letter that is used in the word *FRIEND*.

4. Choosing a letter that comes after *F* in the alphabet.

5. Choosing the letter *H*, then returning the *H* to the alphabet, then choosing a letter in the word *FRACTION*.

6. Choosing a vowel, then not returning the vowel to the alphabet, then choosing another vowel.

**II.** Use the letters in the word *CROSSROADS* to find the following probabilities. Write your answers as decimals or whole numbers. Assume all choices are random.

1. Choosing a consonant.

2. Choosing the letter *S*.

3. Choosing a letter that is not an *S*.

4. Choosing the letter *W*.

5. Choosing a letter in the word *DOOR*.

6. Choosing a letter in the first 20 letters of the alphabet.

7. Choosing the letter *R*, then returning it, then choosing the letter *S*.

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Directions: Use what you know about probability to find each word.

1. Find a word in which the probability of randomly choosing an *A* is $\frac{1}{11}$, of a *B* is $\frac{2}{11}$, of an *I* is $\frac{2}{11}$, of an *L* is $\frac{1}{11}$, of an *O* is $\frac{1}{11}$, of a *P* is $\frac{1}{11}$, of an *R* is $\frac{1}{11}$, of a *T* is $\frac{1}{11}$, and of a *Y* is $\frac{1}{11}$.

2. Find a word in which the probability of randomly choosing a *B* is $\frac{1}{8}$, of choosing a *C* is $\frac{1}{8}$, of choosing a *K* is $\frac{1}{4}$, and of choosing an *O* is $\frac{1}{2}$.

## Problem Solving

With the guidance of your teacher, you and your partner are to quickly design a mini-challenge event that uses a soccer ball or other object. Your event must test your skill at something, and its outcome must be measurable as a success or not a success. Here are two possible events: making baskets in the trash barrel with a soccer ball or another object, and rolling the soccer ball between two rows of desks without hitting any legs. Your teacher will direct you to which object you need to use. Events should not be too easy or too hard, and you should be able to accomplish them very quickly. As you work, answer Questions 1 through 5.

On each of your dry-erase boards, make a tally chart like the following:

| | |
|---|---|
| A Success | |
| Not a Success | |

Each of you will record the results of your partner's attempts at your chosen event.

1. Before you start, predict how many successes you will have out of 1,000 total attempts.

2. Complete 10 attempts each. After these 10 attempts, revise your prediction for 1,000 attempts.

3. Complete 10 more attempts each. After a total of 20 attempts each, revise your prediction for 1,000 attempts.

4. Complete 30 more attempts, for a total of 50 attempts each. Be sure to work quickly. Now make a prediction for 1,000 total attempts.

5. Out of all your predictions, which one was likely the most accurate? Why?

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Directions: Use the probability formula to answer the questions.

In a freezer at an ice cream store, there are 48 equal-size containers of ice cream; 24 are chocolate, 12 are vanilla, 6 are mint, 4 are strawberry, and 2 are pistachio.

1. If Ben chooses a container at random, what is the probability that it is vanilla?

2. What is the probability of choosing a container of chocolate, returning it to the freezer, then choosing a container of mint?

3. What is the probability of choosing a container of strawberry, not returning it to the freezer, then choosing a container of pistachio?

# lesson twenty-six - student resource sheet

**Lesson Objective:** Review finding solutions to the three types of percentage problems.

## Vocabulary Box

**proportion** — An equation of fractions in the form $\frac{a}{b}=\frac{c}{d}$. Example: $\frac{6}{8}=\frac{3}{4}$.

**extremes** — The first and last terms of a proportion. Example: In $\frac{6}{8}=\frac{3}{4}$, 6 and 4 are the extremes.

**means** — The second and third terms of a proportion. Example: In $\frac{6}{8}=\frac{3}{4}$, 8 and 3 are the means.

## Guided Practice

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Directions: Complete the following practice problems. Your teacher will review the answers. Make sure that you show all your work.

**I.** Work with a partner to write a proportion and solve each percentage problem. Be sure that you check each answer.

1. Forty-four is what percent of 80?

2. What is 8% of 450?

3. Forty percent of what number is 12?

4. Uncle Buzz is a bee keeper. He estimates that he has 3,000 bees and that 91% of them are worker bees. According to his estimates, how many worker bees does he have?

5. Of 65 youths who went on a camping trip, 26 got poison ivy. What percent of the youths got poison ivy?

6. A popular singer said that 40% of the songs on her last album were top 10 hits. If she had 6 top 10 hits from her last album, what was the total number of songs on her last album?

**II.** Work independently to write a proportion and solve each percentage problem. Be sure that you check each answer.

1. In a student council election, 700 students voted. Forty percent of those students voted for Esteban. How many votes did Esteban receive?

2. Laura's little brother's play group consists of 15 children. For snack time, chocolate chip cookies are the favorite snack of 12 children. What percent of the children prefer chocolate chip cookies?

## Summary/Closure

**A. Vocabulary Words**

Directions: Answer the following questions about today's vocabulary words.

1. Write a proportion in which the extremes are 6 and 16 and the means are 8 and 12.

2. In this proportion, what is the product of the extremes and the product of the means?

3. Write a proportion in which the extremes are 7 and *x* and the means are 14 and 5.

4. Solve this proportion for *x*.

**B. Summarize What We Learned Today**

Directions: Write three examples of percentage problems, one with a missing part, one with a missing whole, and one with a missing percent. Solve each problem. Then write a few sentences explaining how to solve the three types of percentage problems. You will use this explanation as a personal reminder.

# lesson twenty-seven - student resource sheet

**Lesson Objective:** Review finding solutions to the three types of percentage problems.

## Vocabulary Box

**proportion** — An equation of fractions in the form $\frac{a}{b}=\frac{c}{d}$. Example: $\frac{6}{8}=\frac{3}{4}$.

**extremes** — The first and last terms of a proportion. Example: In $\frac{6}{8}=\frac{3}{4}$, 6 and 4 are the extremes.

**means** — The second and third terms of a proportion. Example: In $\frac{6}{8}=\frac{3}{4}$, 8 and 3 are the means.

## Independent Practice

Directions: Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Write a proportion to solve each percentage problem. Check your answers.

1. Twenty percent of what number is 60?

2. Fourteen is what percent of 40?

3. Seventy-five is 5% of what number?

4. What is 9% of 500?

5. What percent of 90 is 54?

6. Sixty percent of 25 is what number?

7. Janet's hobby is restoring old automobiles. She has restored 20 automobiles, and 15% of those have been convertibles. How many convertibles has she restored?

8. Ahmad can bench press 180 pounds. This is 80% of what Juan can bench press. How many pounds can Juan bench press?

9. Marjorie is a genealogist. She has discovered that 32 of her 40 known ancestors were Irish. What percent of her known ancestors were Irish?


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Directions: The following percentage problems involve percents that are less than 1% or greater than 100%. Write a proportion to solve each problem.

1. What is 250% of 76?

2. Forty-two is 0.3% of what number?

3. A company that makes skateboard wheels estimates that 6 out of every 15,000 wheels that it makes are defective. Based on the company's estimate, what percent of its wheels are defective?


Directions: Use proportions to solve the word problem.

The school jazz band organized a game show as a fundraiser to raise money for a new amplifier and new electric guitars. There were six contestants on the game show. Each contestant earned 5 points for each correct answer but lost 3 points for each incorrect answer.

Find the total points earned by each contestant. Then list them in order from 1st place through 6th place.

**Sue** tried to answer 16 questions. She answered 75% of them correctly and the rest incorrectly.

**Jimmy Ray** answered 9 questions correctly. This represents 60% of the questions he attempted. He answered the rest incorrectly.

Of the 5 questions that **Manka** tried to answer, she answered only 20% incorrectly. She answered the rest correctly.

**Sandip** attempted 45 questions. He answered 40% of these correctly and 60% incorrectly.

**Steven** answered 28 questions correctly. This represents 56% of the questions that he tried to answer. He answered the rest incorrectly.

**Conchita** answered 24 questions incorrectly, which represents 40% of the total number of questions that she attempted. She answered the rest correctly.


Directions: Use proportions to solve each problem.

1. Seventy percent of what number is 315?

2. Thirty-six percent of Packer Middle School's 775 students stated that math is their favorite subject. How many of the school's students prefer math?

3. Some 4,400 attendees at a recent concert bought T-shirts. If 8,000 people attended the concert, what percent of them bought T-shirts?