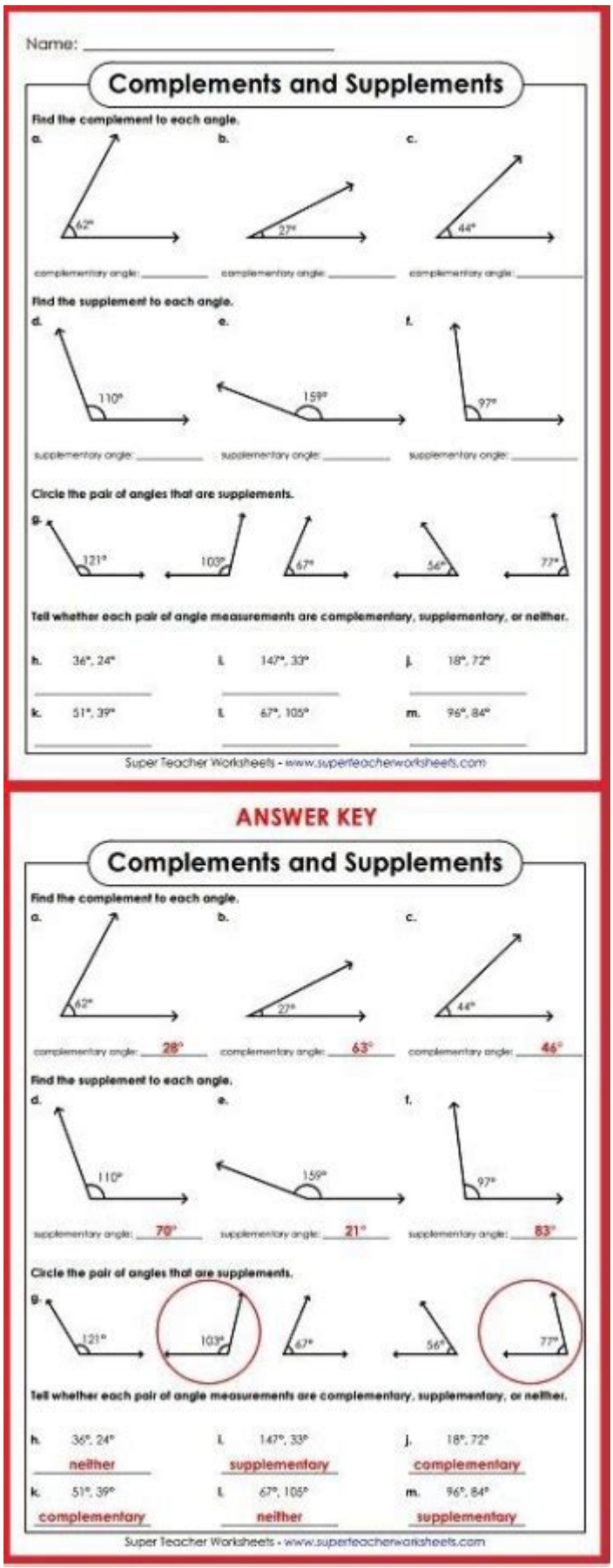
Finding Complementary Angles Answer Key



Name: _____

Complements and Supplements

Find the complement to each angle.

a. 62°

b. 27°

c. 44°

complementary angle: _____ complementary angle: _____ complementary angle: _____

Find the supplement to each angle.

d. 110°

e. 159°

f. 97°

supplementary angle: _____ supplementary angle: _____ supplementary angle: _____

Circle the pair of angles that are supplements.

g. 121° 103° 67° 56° 77°

Tell whether each pair of angle measurements are complementary, supplementary, or neither.

h. 36°, 24° _____

i. 147°, 33° _____

j. 18°, 72° _____

k. 51°, 39° _____

l. 67°, 105° _____

m. 96°, 84° _____

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ANSWER KEY

Complements and Supplements

Find the complement to each angle.

a. 62°

b. 27°

c. 44°

complementary angle: 28° complementary angle: 63° complementary angle: 46°

Find the supplement to each angle.

d. 110°

e. 159°

f. 97°

supplementary angle: 70° supplementary angle: 21° supplementary angle: 83°

Circle the pair of angles that are supplements.

g. 121° 103° 67° 56° 77°

Tell whether each pair of angle measurements are complementary, supplementary, or neither.

h. 36°, 24° neither

i. 147°, 33° supplementary

j. 18°, 72° complementary

k. 51°, 39° complementary

l. 67°, 105° neither

m. 96°, 84° supplementary

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Finding complementary angles is an essential concept in geometry that plays a crucial role in various mathematical applications. Complementary angles are defined as two angles whose measures add up to 90 degrees. Understanding how to find these angles is vital for students and professionals alike, especially in fields that involve geometry, such as architecture, engineering, and physics. This article will explore the definition of complementary angles, methods to find them, examples, and their applications in real-world scenarios.

Understanding Complementary Angles

Definition of Complementary Angles

Complementary angles are pairs of angles that sum to 90 degrees. This means if one angle measures x degrees, the other angle must measure $90 - x$ degrees. For instance, if one angle is 30 degrees, its complement would be 60 degrees since $30 + 60 = 90$.

Visual Representation

To better understand complementary angles, consider a right angle, which measures 90 degrees. If you divide this right angle into two angles, those angles can be complementary. Here are some ways to visualize complementary angles:

- A right triangle, where one of the angles is 90 degrees, and the other two angles are complementary.
- A pair of angles formed by the intersection of two lines, where one angle is acute and the other is its complement.

How to Find Complementary Angles

Finding complementary angles involves basic arithmetic. Here are the steps to determine the complement of a given angle:

Step-by-Step Process

1. Identify the Given Angle: Start with the angle for which you need to find the complement.
2. Subtract from 90 Degrees: Use the formula:
$$
\text{Complement} = 90^\circ - \text{Given Angle}
$$
3. Interpret the Result: Ensure that the resulting angle is a valid angle (between 0 and 90 degrees).

Examples

Let’s go through a few examples to illustrate the process:

- Example 1: Find the complement of a 45-degree angle.

$$
\text{Complement} = 90^\circ - 45^\circ = 45^\circ
$$

- Example 2: Find the complement of a 75-degree angle.

$$
\text{Complement} = 90^\circ - 75^\circ = 15^\circ
$$

- Example 3: Find the complement of a 10-degree angle.

$$
\text{Complement} = 90^\circ - 10^\circ = 80^\circ
$$

These examples demonstrate how straightforward it is to find complementary angles.

Applications of Complementary Angles

Understanding complementary angles has several practical applications:

1. Architecture and Engineering

Architects and engineers often use complementary angles when designing structures. For example, when creating a roof pitch or determining the angles of various components, the concept of complementary angles ensures that elements fit together correctly.

2. Art and Design

In art and design, complementary angles can create visually appealing compositions. Artists often use angles to create perspective and depth, ensuring that elements within a piece complement each other.

3. Navigation and Surveying

In navigation and surveying, complementary angles are crucial for triangulation methods. Surveyors use these angles to determine distances and plot land accurately.

4. Sports and Physical Education

In sports like gymnastics or diving, understanding angles is essential. Athletes must often calculate the angles of their movements, and complementary angles can help improve performance and technique.

Practice Problems

To reinforce your understanding of finding complementary angles, try solving the following problems:

1. Find the complement of a 20-degree angle.
2. What is the complementary angle for 56 degrees?
3. If one angle is 37 degrees, what is the measure of its complement?
4. Determine the complement of a 90-degree angle. (Hint: Is it possible?)
5. Find the complement of an angle measuring 12 degrees.

Answers:

1. 70 degrees
2. 34 degrees
3. 53 degrees
4. There is no complement, as 90 degrees is a right angle.
5. 78 degrees

Common Mistakes to Avoid

When finding complementary angles, it’s easy to make some common errors. Here are a few to watch out for:

- Confusing Complementary with Supplementary: Remember, complementary angles sum to 90 degrees, while supplementary angles sum to 180 degrees.
- Negative Angles: Ensure that your calculations result in positive angles. If you find a negative result, recheck your math.
- Ignoring the Right Angle: In problems involving right angles, remember that the two other angles must be complementary.

Conclusion

In summary, finding complementary angles is a fundamental skill in geometry that has numerous

applications across various fields. By understanding the definition, visualizing the angles, and practicing your skills, you can effectively determine complementary angles in different scenarios. The straightforward process of subtracting an angle from 90 degrees allows for quick calculations, essential for students and professionals alike. With practice problems and an awareness of common pitfalls, you can master this concept, paving the way for deeper explorations into the world of angles and their relationships.

Frequently Asked Questions

What are complementary angles?

Complementary angles are two angles whose measures add up to 90 degrees.

How can I find the measure of a complementary angle if I know one angle?

To find the measure of a complementary angle, subtract the known angle from 90 degrees. For example, if one angle is 30 degrees, the complementary angle is 90 - 30 = 60 degrees.

If two angles are complementary, and one angle is 35 degrees, what is the other angle?

The other angle would be 90 - 35 = 55 degrees.

Are complementary angles always adjacent?

No, complementary angles do not have to be adjacent; they simply need to add up to 90 degrees, regardless of their position.

Can complementary angles be negative?

No, angles cannot be negative. Complementary angles must be positive and their measures must add up to 90 degrees.

What is the complementary angle of a 45-degree angle?

The complementary angle of a 45-degree angle is also 45 degrees, since 45 + 45 = 90 degrees.

How do you solve for a variable in complementary angles?

To solve for a variable in complementary angles, set up an equation where the sum of the angles equals 90 degrees, then solve for the variable.

Are there any real-world applications of complementary angles?

Yes, complementary angles are used in various fields such as architecture, engineering, and design, particularly when creating right angles and ensuring proper alignment.

Can three angles be complementary?

No, only two angles can be complementary. However, three angles can be supplementary if they add up to 180 degrees, but not complementary.

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