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Significant Digits Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

Which of the following digits is always considered significant?

Hint: Think about the rules for significant digits.

◯ A) Leading zeros
◯ B) Trailing zeros in a whole number
◯ **C) Non-zero digits ✓**
◯ D) Placeholder zeros

| Non-zero digits are always considered significant.

Which of the following statements about significant digits are true? (Select all that apply)

Hint: Consider the definitions of significant digits.

☐ **A) All non-zero digits are significant. ✓**
☐ B) Leading zeros are significant.
☐ **C) Trailing zeros in a decimal number are significant. ✓**
☐ **D) Zeros between non-zero digits are significant. ✓**

| All non-zero digits are significant, and trailing zeros in a decimal number are also significant.

Explain why significant digits are important in scientific measurements.

Hint: Consider the implications of precision in measurements.

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> **Significant digits convey the precision of a measurement, ensuring accurate communication of data.**

List the rules for identifying significant digits in a number.

Hint: Think about the different types of digits in a number.

1. Rule 1

> All non-zero digits are significant.

2. Rule 2

> Leading zeros are not significant.

3. Rule 3

> Trailing zeros in a decimal are significant.

4. Rule 4

> Zeros between non-zero digits are significant.

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Rules include: all non-zero digits are significant, leading zeros are not significant, trailing zeros in a decimal are significant, and zeros between non-zero digits are significant.

Part 2: Comprehension and Application

If a measurement is recorded as 0.00450, how many significant digits does it have?

Hint: Count the non-zero digits and any trailing zeros.

○ A) 2
○ **B) 3 ✔**
○ C) 4
○ D) 5

The measurement has 3 significant digits.

Which of the following numbers have four significant digits? (Select all that apply)

Hint: Consider the placement of zeros in each number.

☐ A) 0.004500
☑ **B) 4500 ✔**
☑ **C) 450.0 ✔**
☐ D) 0.04500

The numbers 4500 and 450.0 have four significant digits.

Describe how scientific notation can help clarify the number of significant digits in a measurement.

Hint: Think about how scientific notation represents numbers.

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> **Scientific notation clearly indicates significant digits by showing only the meaningful figures and the exponent.**

When adding 12.11 and 0.023, what is the correct number of decimal places in the result?

Hint: Consider the number of decimal places in each number.

◯ A) 1
◯ **B) 2 ✓**
◯ C) 3
◯ D) 4

| The result should have 2 decimal places.

You are multiplying 3.24 by 0.006. Which of the following results correctly reflects the number of significant digits? (Select all that apply)

Hint: Consider the number of significant digits in each factor.

☐ A) 0.01944
☐ **B) 0.0194 ✓**
☐ C) 0.019
☐ **D) 0.02 ✓**

| The result should reflect the least number of significant digits from the factors, which is 2.

Convert the number 0.0005678 to scientific notation, ensuring the correct number of significant digits is maintained.

Hint: Think about how to express the number in scientific notation.

> **The number in scientific notation is 5.678 x 10^-4.**

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Part 3: Analysis, Evaluation, and Creation

Which of the following operations will result in a number with the same number of significant digits as the original measurement with the fewest significant digits?

Hint: Consider the significant digits in each operation.

○ A) 5.67 + 0.12
○ B) 8.1 × 3.456
○ C) 9.876 - 0.54
○ **D) 7.00 ÷ 2.1 ✔**

> The operation 7.00 ÷ 2.1 will result in a number with the same number of significant digits as the original measurement with the fewest significant digits.

Analyze the following scenarios and identify which correctly apply the rules of significant digits. (Select all that apply)

Hint: Think about the rules for addition, subtraction, multiplication, and division.

☐ **A) Adding 2.5 and 3.45 gives 5.95 ✔**
☐ B) Multiplying 4.56 by 1.2 gives 5.472
☐ **C) Subtract 10.0 from 10.5 gives 0.5 ✔**
☐ D) Dividing 100 by 3.0 gives 33.3

> Adding 2.5 and 3.45 gives 5.95, and subtract 10.0 from 10.5 gives 0.5 are correct applications.

Explain how the rules for significant digits differ between addition/subtraction and multiplication/division.

Hint: Consider the different rules for each operation.

> **In addition and subtraction, the result is limited by the least number of decimal places, while in multiplication and division, it is limited by the least number of significant digits.**

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In which situation would significant digits be most critical?

Hint: Think about the precision required in different scenarios.

◯ A) Estimating the number of people in a crowd
◯ **B) Measuring the width of a human hair** ✓
◯ C) Counting the number of books on a shelf
◯ D) Timing a race with a stopwatch

| Measuring the width of a human hair requires high precision, making significant digits critical.

Evaluate the following statements and identify which correctly apply the concept of significant digits in real-world scenarios. (Select all that apply)

Hint: Consider the importance of significant digits in various fields.

☐ **A) Using significant digits in reporting scientific data ensures consistency.** ✓
☐ B) Significant digits are irrelevant in financial calculations.
☐ **C) Significant digits help in determining the precision of a measurement.** ✓
☐ D) All zeros in a number are always significant.

| Using significant digits in reporting scientific data ensures consistency, and they help in determining the precision of a measurement.

Create a real-world scenario where understanding and applying significant digits would be crucial. Explain the importance of significant digits in this context.

Hint: Think about fields where precision is key.

| **In fields like medicine, accurate dosages require understanding significant digits to ensure patient safety.**

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