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Significant Figures Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

Which of the following digits in the number 0.00540 are significant?

Hint: Consider which digits contribute to the precision of the number.

◯ 5 and 4 only
◯ **5, 4, and the trailing zero ✓**
◯ All zeros
◯ None of the digits

⎸ The significant digits in the number 0.00540 are 5, 4, and the trailing zero.

Select all the statements that correctly describe significant figures:

Hint: Think about the rules that define significant figures.

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

⎸ The correct statements are A, C, and D.

Explain why the number 1000 has only one significant figure, but 1000.0 has five significant figures.

Hint: Consider the role of the decimal point in indicating precision.

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> **The number 1000 has one significant figure because it does not indicate precision beyond the thousands place, while 1000.0 has five significant figures because the decimal point indicates that the trailing zero is significant.**

List the significant figures in the following numbers:

Hint: Identify the significant figures in each number carefully.

1. A) 0.00456

> 4, 5, 6

---

2. B) 230.00

> 2, 3, 0, 0

---

3. C) 500

> 5

> The significant figures are: A) 4, 5, B) 2, 3, 0, 0, C) 5.

Part 2: comprehension and Application

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When rounding the number 47.856 to three significant figures, what is the result?

Hint: Look at the fourth digit to determine how to round.

○ 47.8
○ **47.9 ✓**
○ 48.0
○ 47.86

❘ The result is 47.9 when rounded to three significant figures.

Which of the following numbers have exactly three significant figures?

Hint: Identify the numbers that meet the criteria for three significant figures.

☐ **0.00340 ✓**
☐ **7.50 ✓**
☐ 1500
☐ **0.0450 ✓**

❘ The numbers with exactly three significant figures are B and D.

Describe how significant figures are used to communicate the precision of a measurement in scientific experiments.

Hint: Think about the relationship between measurement and precision.

❘ **Significant figures indicate the precision of a measurement by reflecting the certainty of the digits reported, allowing scientists to convey the reliability of their data.**

You measure a length as 12.34 cm and a width as 0.056 cm. What is the area of the rectangle, expressed with the correct number of significant figures?

Hint: Consider the significant figures of both measurements when calculating the area.

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○ **0.69 cm²** ✓
○ 0.690 cm²
○ 0.6904 cm²
○ 0.69038 cm²

> The area should be expressed as 0.69 cm², reflecting the least number of significant figures from the measurements.

Given the numbers 2.5, 3.456, and 0.004, which calculations will result in a product with two significant figures?

Hint: Identify which calculations will yield the least number of significant figures.

☐ 2.5 × 3.456
☐ **2.5 × 0.004** ✓
☐ 3.456 × 0.004
☐ 2.5 × 3.456 × 0.004

> The calculation 2.5 × 0.004 will result in a product with two significant figures.

Part 3: Analysis, Evaluation, and Creation

If you have the numbers 0.0045, 45.00, and 4500, which has the greatest number of significant figures?

Hint: Compare the number of significant figures in each number.

○ 0.0045
○ **45.00** ✓
○ 4500
○ All have the same number of significant figures

> The number 45.00 has the greatest number of significant figures, which is four.

Which of the following statements are true about significant figures in calculations?

Hint: Consider the rules that apply to addition, subtraction, multiplication, and division.

☐ **In addition, the result should match the number with the fewest decimal places.** ✓
☐ **In multiplication, the result should match the number with the fewest significant figures.** ✓
☐ In subtraction, the result should match the number with the most significant figures.

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☐ **In division, the result should match the number with the fewest significant figures. ✓**

| The true statements are A, B, and D.

Analyze the impact of using different numbers of significant figures in reporting scientific data. Why is it important to maintain consistency?

Hint: Think about how precision affects scientific communication.

| **Using different numbers of significant figures can lead to misinterpretation of data, making it crucial to maintain consistency for clarity and accuracy in scientific communication.**

A scientist records a measurement as 0.00320 kg. Another scientist argues it should be 0.0032 kg. Which is more precise, and why?

Hint: Consider the number of significant figures in each measurement.

○ **0.00320 kg, because it shows more significant figures ✓**

○ 0.0032 kg, because it is simpler

○ Both are equally precise

○ Neither, because precision is not affected by significant figures

| 0.00320 kg is more precise because it indicates an additional significant figure.

Evaluate the following scenarios and select those where significant figures are crucial:

Hint: Think about the importance of precision in different contexts.

☐ Reporting the distance between two cities

☐ **Calculating the dosage of medication ✓**

☐ **Measuring the temperature of a room ✓**

☐ Estimating the number of people in a crowd

| Significant figures are crucial in scenarios B and C.

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Create a real-world scenario where significant figures play a critical role in decision-making. Explain the scenario and the importance of using the correct number of significant figures.

Hint: Consider situations in fields like medicine, engineering, or environmental science.

In medicine, calculating the correct dosage of medication based on a patient's weight requires precise significant figures to ensure safety and effectiveness.

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