Significant Figure Practice

Rules for Significant Figures

Zeros to the right of a decimal point are always considered significant. Example 0.120, the last zero is considered significant.

Zeros to the left of the first nonzero digit are never considered significant. Example 0.00120, the first two zeros are insignificant and the last zero is significant.

Zeros on the end of a number without a decimal point are assumed not to be significant. Example 45000, the last three zeros are insignificant.

Multiplication and Division

The answer cannot contain more significant figures than the factor that has the fewest number of significant figures. Example on page 95.

Addition and Subtraction

The answer is rounded to the same number of decimal places as the quantity with the fewest decimal places. Example on page 96.

Exact Numbers

When using exact numbers in calculations, they can be considered to have as many significant figures as desired because they contain no uncertainty.

Rounding Rules

If the number to the right is greater than 5, round the number to the left up. Example: Round 0.0568 to two significant figures = 0.057

When the number to the right is less than 5, we leave the number to the left along. Example: Round .0564 to two significant figures = 0.056

When the number to the right is 5, there are two possibilities.

If the number to the left of 5 is even, then the number stays the same. Example: Round 0.0565 to two significant figures = 0.056

If the number to the left of the five is odd, then round up to the next number. Example: Round 0.0575 to two significant figures = 0.058

Practice

State the number of significant figures in the following:

Example: 9.01 has 3 significant figures

1. 1 =
2. 10.001 =

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3. 100 =
4. 1001 =
5. 16.5600 =
6. 199.011111 =
7. 11.0 =
8. 1 000 000 001.00000 =
9. 10101010 =
10. 1 000 000 =
11. 1 000 000.0 =
12. 100100 =
13. 3 ⅓ =
14. 3.141592654 =
15. π =
16. 2.71828 =
17. ⅛ =
18. 0.01 =
19. 0.00100 =
20. 0.001110 =
21. 0.10100 =
22. 1 x 10^-3 =
23. 1 x 10^3 =
24. 10 x 10^-2 =
25. 10 x 10^2 =
26. 1.01 x 10^4 =
27. 5.0 x 10^5 =
28. 6.0000 x 10^-3 =
29. 9.0001 x 10^2 =

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Practicing Using Significant Figures

Example: 1.0 x 10.0 + 2.00001 = 12, because 1.0 only has two significant digits

1. 3.25 x 10.46 +2.44 =
2. 4.87 x 3.1 =
3. =
4. 14.35 + 0.022001 =
5. 145.3 – 4.68 =
6. 25.0 x 2.0 =
7. 5.0^3 =
8. =
9. =
10. 25^2 =

Word Problems using Significant Figures

1. If there is 4.00 g sample of NaCl and the sample contains 1.57 g of Sodium, how much Cl would there be in a 13.256 g sample of Sodium Chloride?
2. How many moles does 6.590 g of Aluminum equal (Molecular Weight = 26.9815g)?
3. Convert -40.0 ˚F to ˚C.
4. If we have 3.95 feet, how many inches does this equal?
5. If we have 132.2491 g H_2 reacting with oxygen, how much H_2O will we have? (MW of Hydrogen = 1.0079g, MW of Oxygen = 15.9994g)

   $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(l)}$
6. If we have 2.1 grams of Al in a thermite reaction, how many grams of Ferric oxide will we need in order to fully react with the Aluminum? (MW of Al = 26.9815g, MW of Fe = 55.845g, MW of O = 15.9994g)

   $Fe_2O_{3(s)} + 2Al_{(s)} \rightarrow Al_2O_{3(s)} + 2Fe_{(s)}$
7. How many millimeters would there be if there are 1.20 m?
8. Calculate the kinetic energy of a pendulum weighing 0.25 kg and a velocity of 0.793 m/s. (Kinetic Energy = mv^2)
9. Calculate the weight % of water in a sample of 25.249 g hydrated Barium Chloride.

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$BaCl_2 \cdot 2H_2O$