

- b. Under what condition will percentage error be negative?
26. How is the average for a set of values calculated?
 27. What is meant by a mass measurement expressed in this form: $4.6 \text{ g} \pm 0.2 \text{ g}$?
 28. Suppose a graduated cylinder were not correctly calibrated. How would this affect the results of a measurement? How would it affect the results of a calculation using this measurement?
 29. Round each of the following measurements to the number of significant figures indicated.
 - a. 67.029 g to three significant figures
 - b. 0.15 L to one significant figure
 - c. 52.8005 mg to five significant figures
 - d. 3.174 mol to three significant figures
 30. State the rules governing the number of significant figures that result from each of the following operations.
 - a. addition and subtraction
 - b. multiplication and division
 31. What is the general form for writing numbers in scientific notation?
 32. a. By using x and y , state the general equation for quantities that are directly proportional.
 b. For two directly proportional quantities, what happens to one variable when the other variable increases?
 33. a. State the general equation for quantities, x and y , that are inversely proportional.
 b. For two inversely proportional quantities, what happens to one variable when the other increases?
 34. Arrange in the correct order the following four basic steps for finding the solution to a problem: compute, plan, evaluate, and analyze.
 37. What is the percentage error of a length measurement of 0.229 cm if the correct value is 0.225 cm ?
 38. How many significant figures are in each of the following measurements? (Hint: See Sample Problem D.)
 - a. 0.4004 mL
 - b. 6000 g
 - c. 1.000 km
 - d. $400. \text{ mm}$
 39. Calculate the sum of 6.078 g and 0.3329 g .
 40. Subtract 7.11 cm from 8.2 cm . (Hint: See Sample Problem E.)
 41. What is the product of 0.8102 m and 3.44 m ?
 42. Divide 94.20 g by 3.167 mL .
 43. Write the following numbers in scientific notation.
 - a. 0.000 673 0
 - b. 50 000.0
 - c. 0.000 003 010
 44. The following numbers are in scientific notation. Write them in ordinary notation.
 - a. $7.050 \times 10^3 \text{ g}$
 - b. $4.000 \text{ 05} \times 10^7 \text{ mg}$
 - c. $2.350 \text{ 0} \times 10^4 \text{ mL}$
 45. Perform the following operation. Express the answer in scientific notation and with the correct number of significant figures.
 $0.002115 \text{ m} \times 0.0000405 \text{ m}$
 46. A sample of a certain material has a mass of $2.03 \times 10^{-3} \text{ g}$. Calculate the volume of the sample, given that the density is $9.133 \times 10^{-1} \text{ g/cm}^3$. Use the four-step method to solve the problem. (Hint: See Sample Problem F.)

PRACTICE PROBLEMS

35. A student measures the mass of a sample as 9.67 g . Calculate the percentage error, given that the correct mass is 9.82 g . (Hint: See Sample Problem C.)
36. A handbook gives the density of calcium as 1.54 g/cm^3 . Based on lab measurements, what is the percentage error of a density calculation of 1.25 g/cm^3 ?

MIXED REVIEW

47. A man finds that he has a mass of 100.6 kg . He goes on a diet, and several months later he finds that he has a mass of 96.4 kg . Express each number in scientific notation, and calculate the number of kilograms the man has lost by dieting.
48. A large office building is $1.07 \times 10^2 \text{ m}$ long, 31 m wide, and $4.25 \times 10^2 \text{ m}$ high. What is its volume?