Solutions

SIGNIFICANT FIGURES GUIDELINES

** the Significant Figures of a measurement are those digits known with certainty plus the rightmost digit that is estimated
** every measurement has a certain number of significant figures

RULES:

1) Every NONZERO DIGIT in a measurement is significant
2) "Captive" ZEROS are ALWAYS significant.
3) LEADING ZEROS are NOT significant.
4) TRAILING ZEROS are ONLY SIGNIFICANT IF there is a DECIMAL POINT in the number.
5) "Counted" values and numbers defined in relationships(100 cm=1m) are EXACT NUMBERS and have an UNLIMITED NUMBER of significant figures.

RULES FOR CALCULATIONS WITH SIGFIG's

1) In MULTIPLICATION AND DIVISION, the answer can have NO MORE **SIGNIFICANT FIGURES** THAN THE LEAST NUMBER OF SIGNIFICANT FIGURES IN ANY MEASUREMENT IN THE PROBLEM.
2) IN ADDITION AND SUBTRACTION, the answer can have NO MORE DECIMAL PLACES THAN THE LEAST NUMBER OF **DECIMAL PLACES** IN ANY MEASUREMENT IN THE PROBLEM
3) Round to the appropriate number of SIGFIG's:

a) If the first nonsignificant figure is LESS than 5, drop all nonsignificant figures
b) If the first nonsignificant figure is 5 or GREATER than 5, increase the last significant figure by one and drop all nonsignificant figures.

PROBLEM SETS:

1. How many significant figures are in each measurement?

a) 0.723 m 3
b) 14.0 g 3
c) 123,000 m 3
d) 0.00512 kg 3
e) 1050 cm 3

2. Round the measurements in question 1 to two significant figures.

0.72
14
120,000 or 1.2×10^5
0.0051 or 5.1×10^{-3}
1.1×10^3 or 1100

3. Multiply or divide the following measurements, and round your answer to the correct number of significant figures:

a) 3.4 m x 7.8 m $27\ m^2$
b) 7.00 cm x 9.8 cm $69\ cm^2$
c) 1.56 mm x 0.864 mm x 14.00 mm $18.9\ mm^3$
d) 6.88 m /2.6 m 2.6
e) 52.98 g/ 1.8 mL 29 g/mL
f) 0.14 kg/0.0131 L 11 kg/L

4. Add or subtract the following measurements, and round your answer to the correct number of significant figures:

a) 2.34 m + 18.28 m 20.62 m
b) 828.2 g – 134 g 694 g
c) 0.278 cm + 0.0832 cm + 0.15 cm 0.51 cm
d) 54.2 mg – 12.66 mg 41.5 mg
e) 6.40 ng + 0.450 ng + 1.001 ng 7.85 ng

5. Solve each problem and round your answer to the correct number of significant figures:

a) (5.3 m) x (1.54 m) $8.2\ m^2$
b) 23.5 m + 2.1 m + 7.26 m 32.9 m
c) 189.427 g – 19.00 g 170.43 g
d) $\frac{0.497\ m}{1.50\ m}$ 0.331