Practice Problems for Calculator Use

Use your calculator to determine the correct answer with the proper number of significant figures for each of the following problems. In some cases there may be more than one way to key in the digits and operations. Try to find the most reliable and efficient method for your calculator. Answers are on the next page.

1. $x = (2)(39.0983) + (2)(51.996) + (7)(15.9994)$

2. $x = \dfrac{1.44 \times 10^4}{2.40 \times 10^8}$

3. $x = \dfrac{(3.5 \times 10^{-5})(6.2 \times 10^{12})}{3.3 \times 10^{-15}}$

4. $x = \sqrt{(7.56 \times 10^{-5})(0.125)}$

5. $x = \left[\dfrac{(0.5622)(3.20 + 8.111)}{621.25} \right]^{1/3}$

6. $x = \sqrt{(7.25 \times 10^5)^3}$

7. $x = \left[\dfrac{(6.32 \times 10^5)(7.66 \times 10^{-4})}{3.726 \times 10^9} \right]^{-3}$

8. $\bar{x} = 2.314 \pm \sigma$, where $\sigma = \sqrt{\dfrac{(0.035)^2 + (0.022)^2 + (0.013)^2}{2}}$

    [σ in this calculation is the standard deviation of an average, $\bar{x}$, of three pieces of data.]

9. $x = \exp\left[\dfrac{-33.67}{(8.314 \times 10^{-3})(298)} \right]$

    [exp is a convenient way of writing the base of the natural logarithm, e, in cases where the exponent is a complicated mathematical expression that would be too small if written as a superscript to e.]

10. $x = \text{Antilog} (-10.488)$

    [The number -10.488 is a base-10 logarithm; x is the number whose logarithm is -10.488.]

Answers

1. 294.184   (3 decimal places, 6 sig. figs.)

2. 6.00×10^{-5} (3 sig. figs.; you must add the two zeros your calculator drops.)

3. $6.5_{7575...} \times 10^{22} = 6.6 \times 10^{22}$ (Enter scientific notation with the EXP or EE key, not the 10^x key. The 10^x key is the base 10 antilog key. Also, do not enter scientific notation with the keystrokes for multiplication and raising a number to a power; e.g., not $3.5 \times 10^{\wedge}5$ or $3.5 \times 10 x^y 5$.)

4. $3.07_4 \times 10^{-3} = 3.07 \times 10^{-3}$ (Use parenthesis for the product, or calculate the product before taking the square root of the answer.)

5. 0.2171   (Try using parentheses and the cube root key or x^y key.)

6. 6.17×10^8

7. 4.56×10^{20}

8. $\bar{x} = 2.314 \pm 0.031$ (The standard deviation always has the same number of decimal places as the number to which it pertains; e.g., 3 in this case.)

9. $x = 1.25 \times 10^{-6}$ (Use the e^x key for the exponential function; this is often a shift on the *ln* key.)

10. $x = 3.25 \times 10^{-11}$ (Antilog is 10^x. Be sure your calculator shows the answer in scientific exponential notation, or else it may truncate digits for antilogs of very small numbers. Note: The number of significant digits in the coefficient of a number expressed in scientific exponential notation is always the same as the number of *decimal places* in its logarithm, and vice versa; e.g., 3 in this case.)