Subtraction of Decimal Numbers

To subtract decimal numbers, they must first be arranged so that the decimal points are aligned vertically and according to place value. That is, subtracting tenths from tenths, ones from ones, hundreds from hundreds, and so forth.

Example: A series circuit containing two resistors has a total resistance (R_T) of 37.272 ohms. One of the resistors (R_1) has a value of 14.88 ohms. What is the value of the other resistor (R_2)?

$$R_2 = R_T - R_1 = 37.272 - 14.88$$

Arrange the decimal numbers in a vertical column so that the decimal points are aligned and then subtract.

$$\begin{array}{r} 37.272 \\ -14.88 \\ \hline 22.392 \end{array}$$

Therefore, the second resistor, $R_2 = 22.392$ ohms.

Multiplication of Decimal Numbers

To multiply decimal numbers, vertical alignment of the decimal point is not required. Instead, align the numbers to the right in the same way that whole numbers are multiplied (with no regard to the decimal points or place values) and then multiply. The last step is to place the decimal point in the correct place in the answer. To do this, count the number of decimal places in each of the numbers, add the total, and then assign that number of decimal places to the result.

Example: To multiply 0.2 × 6.03, arrange the numbers vertically and align them to the right. Multiply the numbers, ignoring the decimal points for now.

$$\begin{array}{r} 6.03 \\ \times\ 0.2 \\ \hline 1206 \end{array} \quad \text{(ignore the decimal points, for now)}$$

After multiplying the numbers, count the total number of decimal places in both numbers. For this example, 6.03 has 2 decimal places and 0.2 has 1 decimal place. Together there are a total of 3 decimal places. The decimal point for the answer is placed 3 decimal places from the right. Therefore, the answer is 1.206.

$$\begin{array}{rl} 6.03 & \longleftarrow \text{2 decimal places} \\ \times\ 0.2 & \longleftarrow \text{1 decimal place} \\ \hline 1.206 & \longleftarrow \text{3 decimal places} \end{array}$$

Example: Using the formula watts = amperes × voltage, what is the wattage of an electric drill that uses 9.45 amperes from a 120-volt source? Align the numbers to the right and multiply.

After multiplying the numbers, count the total number of decimal places in both numbers. For this example, 9.45 has 2 decimal places and 120 has no decimal place. Together there are 2 decimal places. The decimal point for the answer is placed 2 decimal places from the right. Therefore, the answer is 1,134.00 watts, or simplified to 1,134 watts.

$$\begin{array}{rl} 9.45 & \longleftarrow \text{2 decimal places} \\ \times\ 120 & \longleftarrow \text{no decimal place} \\ \hline 000 & \\ 1890 & \\ +\ 945 & \\ \hline 1{,}134.00 & \longleftarrow \text{2 decimal places} \end{array}$$

Division of Decimal Numbers

Division of decimal numbers is performed the same way as whole numbers, unless the divisor is a decimal.

$$\begin{array}{r} \text{quotient} \\ \text{divisor}\,\overline{)\,\text{dividend}} \end{array}$$

When the divisor is a decimal, it must be changed to a whole number before dividing. To do this, move the decimal in the divisor to the right until there are no decimal places. At the same time, move the decimal point in the dividend to the right the same number of places. Then divide. The decimal in the quotient is placed directly above the decimal in the dividend.

Example: Divide 0.144 by 0.12

$$\begin{array}{rcl} 0.12\,\overline{)\,0.144} & = & 12.\,\overline{)\,14.4} \\ & & \underline{-\ 12} \\ & & 24 \\ & & \underline{-\ 24} \\ & & 0 \end{array} \qquad \begin{array}{r} 1.2 \\ \\ \\ \\ \\ \end{array}$$

Move the decimal in the divisor (0.12) two places to the right. The result is 12.0. Next, move the decimal in the dividend (0.144) two places to the right. The result is 14.4. Now divide. The result is 1.2.

Example: The wing area of an airplane is 262.6 square feet and its span is 40.4 feet. Find the mean chord of its wing using the formula: area ÷ span = mean chord.