Long Multiplication Scenarios

Example 1:

1. Determine the number of digits occupying decimal place values in the multiplicand and multiplier.

$$52.2 \longleftarrow 1 \text{ decimal digit}$$
$$\times \; 4.87 \longleftarrow 2 \text{ decimal digits}$$

2. Move the decimals of the multiplicand and multiplier behind the digits. By moving the decimals, the multiplicand and multiplier become integers.

$$522.$$
$$\times \; 487.$$

3. Multiply the multiplicand by the rightmost digit of the multiplier.

$$522.$$
$$\times \; 487.$$
$$\overline{3{,}654.}$$

Long Multiplication Scenarios

Example 1:

4. When moving to the next multiplier digit, place a zero below the most recent product. The number of zeros placed under the most recent product increases by one with each movement to the left.

$$
\begin{array}{r}
522. \\
\times\ 487. \\
\hline
3,654. \\
0.
\end{array}
$$

5. Multiply the multiplicand by the next digit of the multiplier.

$$
\begin{array}{r}
522. \\
\times\ 487. \\
\hline
3,654. \\
41,760.
\end{array}
$$

Long Multiplication Scenarios

6.   When moving to the next multiplier digit, place two zeros below the most recent product.

$$
\begin{array}{r}
522 \\
\times\ \ 487 \\
\hline
3{,}654 \\
41{,}760 \\
00 \\
\end{array}
$$

7.   Multiply the multiplicand by the next digit of the multiplier.

$$
\begin{array}{r}
522 \\
\times\ \ 487 \\
\hline
3{,}654 \\
41{,}760 \\
208{,}800 \\
\end{array}
$$

Long Multiplication Scenarios

Example 1:

8.   **Add the products together.**

$$
\begin{array}{r}
522. \\
\times\ \ 487. \\
\hline
3{,}654. \\
41{,}760. \\
+\ 208{,}800. \\
\hline
254{,}214.
\end{array}
$$

9.   **Move the decimal to the left based on the sum of the decimal digits from the original multiplication equation.**

$$
\begin{array}{r}
522. \\
\times\ \ 487. \\
\hline
3{,}654. \\
41{,}760. \\
+\ 208{,}800. \\
\hline
254.214.
\end{array}
$$

1 + 2 = 3

3 2 1

Long Multiplication Scenarios

Example 1:

10. Once the decimal is moved, the final number is the product of the original multiplication equation.

$$522.$$
$$\times \quad 487.$$
$$\overline{}$$
$$3,654.$$
$$41,760.$$
$$+ \ 208,800.$$
$$\overline{}$$
$$254,214.$$
$$\downarrow$$
$$254.214$$

final product

Long Multiplication Scenarios

Example 2:

1. Determine the number of digits occupying decimal place values in the multiplicand and multiplier.

$$0.455 \longleftarrow \text{3 decimal digit}$$
$$\times \ 7. \longleftarrow \text{0 decimal digits}$$

2. Move the decimals of the multiplicand and multiplier behind the digits. By moving the decimals, the multiplicand and multiplier become integers.

$$455.$$
$$\times \quad 7.$$

3. Multiply the multiplicand by the rightmost digit of the multiplier.

$$455.$$
$$\times \quad 7.$$
$$\overline{3,185.}$$

Long Multiplication Scenarios

Example 2:

4.   Move the decimal to the left based on the sum of the decimal digits from the original multiplication equation.

$$455.$$
$$\times \quad 7.$$
$$\overline{3.185.} \quad 3 + 0 = 3$$

3 2 1

5.   Once the decimal is moved, the final number is the product of the original multiplication equation.

$$455.$$
$$\times \quad 7.$$
$$\overline{3,185.}$$

$$3.185$$

final product

Long Multiplication Scenarios

Example 3:

1. Determine the number of digits occupying decimal place values in the multiplicand and multiplier.

$$
\begin{array}{r}
57. \\
\times \quad 42. \\
\hline
\end{array}
$$

$\longleftarrow$ **0** decimal digit

$\longleftarrow$ **0** decimal digits

2. Multiply the multiplicand by the rightmost digit of the multiplier.

$$
\begin{array}{r}
57. \\
\times \quad 42. \\
\hline
114. \\
\end{array}
$$

3. When moving to the next multiplier digit, place a zero below the most recent product. The number of zeros placed under the most recent product increases by one with each movement to the left.

$$
\begin{array}{r}
57. \\
\times \quad 42. \\
\hline
114. \\
0. \\
\end{array}
$$

Long Multiplication Scenarios

Example 3:

4. **Multiply the multiplicand by the next digit of the multiplier.**

$$
\begin{array}{r}
57. \\
\times\ 42. \\
\hline
114. \\
2{,}280. \\
\end{array}
$$

5. **Add the products together. Since the original multiplication equation did not contain any digits in decimal place values, the sum of the products is the final answer.**

$$
\begin{array}{r}
57. \\
\times\ 42. \\
\hline
114. \\
+\ 2{,}280. \\
\hline
2{,}394. \\
\end{array}
$$

Long Multiplication Scenarios

Example 4:

1. Determine the number of digits occupying decimal place values in the multiplicand and multiplier.

$$0.215 \longleftarrow \text{3 decimal digit}$$
$$\times\ 0.378 \longleftarrow \text{3 decimal digits}$$

2. Move the decimals of the multiplicand and multiplier behind the digits. By moving the decimals, the multiplicand and multiplier become integers.

$$0215.$$
$$\times\ 0378.$$

3. Multiply the multiplicand by the rightmost digit of the multiplier.

$$0215.$$
$$\times\ 0378.$$
$$\overline{1,720.}$$

Long Multiplication Scenarios

Example 4:

4. When moving to the next multiplier digit, place a zero below the most recent product. The number of zeros placed under the most recent product increases by one with each movement to the left.

$$
\begin{array}{r}
0215. \\
\times\ 0378. \\
\hline
1,720. \\
0.
\end{array}
$$

5. Multiply the multiplicand by the next digit of the multiplier.

$$
\begin{array}{r}
0215. \\
\times\ 0378. \\
\hline
1,720. \\
15,050.
\end{array}
$$

Long Multiplication Scenarios

6.   When moving to the next multiplier digit, place two zeros below the most recent product.

$$
\begin{array}{r}
0215 \\
\times\ 0378 \\
\hline
1,720 \\
15,050 \\
00
\end{array}
$$

7.   Multiply the multiplicand by the next digit of the multiplier.

$$
\begin{array}{r}
0215 \\
\times\ 0378 \\
\hline
1,720 \\
15,050 \\
64,500
\end{array}
$$

Long Multiplication Scenarios

Example 4:

8. When moving to the next multiplier digit, place three zeros
    below the most recent product.

$$
\begin{array}{r}
0215. \\
\times\ 0378. \\
\hline
1,720. \\
15,050. \\
64,500. \\
000. \\
\end{array}
$$

9. Multiply the multiplicand by the next digit of the multiplier.

$$
\begin{array}{r}
0215. \\
\times\ 0378. \\
\hline
1,720. \\
15,050. \\
64,500. \\
0,000. \\
\end{array}
$$

Long Multiplication Scenarios

Example 4:

10.   **Add the products together.**

$$
\begin{array}{r}
\color{orange}{0215.} \\
\times\ \color{pink}{0378.} \\
\hline
\color{teal}{1,720.} \\
\color{teal}{15,050.} \\
\color{teal}{64,500.} \\
+\quad \color{teal}{0,000.} \\
\hline
\color{purple}{81,270.}
\end{array}
$$

11.   **Move the decimal to the left based on the sum of the decimal digits from the original multiplication equation.**

$$
\begin{array}{r}
\color{orange}{0215.} \\
\times\ \color{pink}{0378.} \\
\hline
\color{teal}{1,720.} \\
\color{teal}{15,050.} \\
\color{teal}{64,500.} \\
+\quad \color{teal}{0,000.} \\
\hline
\color{purple}{.081,270.}
\end{array}
$$

$\color{brown}{3} + \color{pink}{3} = \color{green}{6}$

6 5 4 3 2 1

Long Multiplication Scenarios

Example 4:

12. Once the decimal is moved, the final number is the product of the original multiplication equation.

$$
\begin{array}{r}
0215. \\
\times\ 0378. \\
\hline
1{,}720. \\
15{,}050. \\
64{,}500. \\
+\quad 0{,}000. \\
\hline
81{,}270.
\end{array}
$$

↓

0.08127

final product

Long Multiplication Scenarios

Example 5:

Any number multiplied by one equals itself.

$$
\begin{array}{r}
5.\\
\times\ 1.\\
\hline
5.
\end{array}
\qquad
\begin{array}{r}
1.\\
\times\ 5.\\
\hline
5.
\end{array}
$$

Example 6:

Any number multiplied by zero equals zero.

$$
\begin{array}{r}
5.\\
\times\ 0.\\
\hline
0.
\end{array}
\qquad
\begin{array}{r}
0.\\
\times\ 5.\\
\hline
0.
\end{array}
$$