Long Multiplication Scenarios

Example 1:

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

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

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.

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

$$\downarrow$$

254.214 ← **3** decimal digits

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.

$$
\begin{array}{r}
455. \\
\times \quad 7. \\
\hline
3.185.
\end{array}
\qquad 1 + 2 = 3
$$

3 2 1

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

$$
\begin{array}{r}
455. \\
\times \quad 7. \\
\hline
3{,}185.
\end{array}
$$

3.185 ← **3** decimal digits

final product

Long Multiplication Scenarios

Example 3:

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

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

←——— **0** decimal digit

←——— **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

Example 4:

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

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.

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

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Long Multiplication Scenarios

10.   **Add the products together.**

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

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

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

3 + 3 = 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.

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

$$1,720.$$
$$15,050.$$
$$64,500.$$
$$+ \ 0,000.$$

$$81,270.$$

$\downarrow$

$$0.08127 \leftarrow 6 \text{ decimal digits}$$

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.

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