

Matrix method of multiplication

$$\begin{array}{r}
 \times \quad 400 \quad 50 \quad 6 \\
 100 \quad \boxed{\begin{array}{|c|c|c|} \hline 40,000 & 5000 & 600 \\ \hline \end{array}} \\
 20 \quad \boxed{\begin{array}{|c|c|c|} \hline 8000 & 1000 & 120 \\ \hline \end{array}} \\
 3 \quad \boxed{\begin{array}{|c|c|c|} \hline 1200 & 150 & 18 \\ \hline \end{array}} \\
 \hline
 \end{array}
 = \begin{array}{r}
 40,000 \\
 8000 \\
 1200 \\
 5000 \\
 1000 \\
 150 \\
 600 \\
 120 \\
 18 \\
 \hline
 \end{array}
 = \begin{array}{r}
 40,000 \\
 8000 \\
 1200 \\
 5000 \\
 1000 \\
 150 \\
 600 \\
 120 \\
 18 \\
 \hline
 \end{array}
 = 56,088$$

Link to algebra

$$\begin{array}{r}
 \times \quad x \quad 2 \\
 (x+1)(x+2) = x \quad \boxed{\begin{array}{|c|c|} \hline x^2 & 2x \\ \hline \end{array}} \\
 1 \quad \boxed{\begin{array}{|c|c|} \hline x & 2 \\ \hline \end{array}} \\
 \hline
 \end{array}
 = x^2 + 3x + 2$$

$$\begin{array}{r}
 \times \quad x \quad -y \quad 2 \\
 (2x+y+1)(x-y+2) = 2x \quad \boxed{\begin{array}{|c|c|c|} \hline 2x^2 & -2xy & 4x \\ \hline \end{array}} \\
 y \quad \boxed{\begin{array}{|c|c|c|} \hline xy & -y^2 & 2y \\ \hline \end{array}} \\
 1 \quad \boxed{\begin{array}{|c|c|c|} \hline x & -y & 2 \\ \hline \end{array}} \\
 \hline
 \end{array}
 = 2x^2 - xy + 5x - y^2 + y + 2$$

$$\begin{array}{r}
 \times \quad x \quad 3 \\
 (x+1)(x+2)(x+3) = (x^2 + 3x + 2)(x+3) = x^2 \quad \boxed{\begin{array}{|c|c|} \hline x^3 & 3x^2 \\ \hline \end{array}} \\
 3x \quad \boxed{\begin{array}{|c|c|} \hline 3x^2 & 9x \\ \hline \end{array}} \\
 2 \quad \boxed{\begin{array}{|c|c|} \hline 2x & 6 \\ \hline \end{array}} \\
 \hline
 \end{array}
 = x^3 + 6x^2 + 11x + 6$$

Multiply decimals without confusion by firstly converting to integers

e.g. 0.0123×0.456

$$\begin{aligned}
 &= 123 \times 10^{-4} \times 456 \times 10^{-3} \\
 &= 123 \times 456 \times 10^{-7}
 \end{aligned}$$

Use matrix method to find $123 \times 456 = 56,088$

Answer is therefore $56,088 \times 10^{-7} = \mathbf{0.0056088}$

Or just take care with the decimal point and use the matrix method as before

$$\begin{array}{r}
 \times \quad 10 \quad 7 \quad 0.2 \\
 0.15 \times 17.2 = 0.1 \quad \boxed{\begin{array}{|c|c|c|} \hline 1 & 0.7 & 0.02 \\ \hline \end{array}} \\
 0.05 \quad \boxed{\begin{array}{|c|c|c|} \hline 0.5 & 0.35 & 0.01 \\ \hline \end{array}} \\
 \hline
 \end{array}
 = \begin{array}{r}
 1.00 \\
 0.70 \\
 0.02 \\
 0.50 \\
 0.35 \\
 0.01 \\
 \hline
 \end{array}
 = \mathbf{2.58}$$