

$$\begin{aligned}
 ① & 23 + 47 \times 76 - (113 \div 5) + 992 \times 2 = 5556.4 \\
 & = 23 + 47 \times 76 - 22.6 + 992 \times 2 \\
 & = 23 + 3572 - 22.6 + 992 \times 2 \\
 & = 23 + 3572 - 22.6 + 1984 \\
 & = 3595 - 22.6 + 1984 \\
 & = 3572.4 + 1984 \\
 & = 5556.4
 \end{aligned}$$

$$\begin{array}{r}
 \begin{array}{r}
 22.6 \\
 \hline
 5 \overline{) 13.0}
 \end{array} \\
 \begin{array}{r}
 10 \\
 \hline
 013 \\
 \begin{array}{r}
 10 \\
 \hline
 030 \\
 \begin{array}{r}
 30 \\
 \hline
 00
 \end{array}
 \end{array}
 \end{array}
 \end{array}
 \quad
 \begin{array}{r}
 3595.0 \\
 - 22.6 \\
 \hline
 3572.4
 \end{array}$$

$$\begin{array}{r}
 \begin{array}{r}
 76 \\
 \times 47 \\
 \hline
 532 \\
 3040 \\
 \hline
 3572
 \end{array}
 \\
 \begin{array}{r}
 992 \\
 \times 2 \\
 \hline
 1984
 \end{array}
 \end{array}
 \quad
 \begin{array}{r}
 3572.4 \\
 + 1984.0 \\
 \hline
 5556.4
 \end{array}$$

Fractions

②

Group different types of fractions

$$\frac{12}{7}, \frac{19}{8}, \frac{273}{11}, \frac{3}{8}, \frac{9}{29}, \frac{1}{8}, \frac{6}{7}, \frac{2}{11}, \frac{18}{29}$$

proper = $\frac{3}{8}, \frac{9}{29}, \frac{1}{8}, \frac{6}{7}, \frac{2}{11}, \frac{18}{29}$

improper = $\frac{12}{7}, \frac{19}{8}, \frac{273}{11}$

like = $(\frac{12}{7}, \frac{6}{7}), (\frac{19}{8}, \frac{3}{8}, \frac{1}{8}), (\frac{273}{11}, \frac{1}{11}), (\frac{9}{29}, \frac{18}{29})$

unlike = $\frac{12}{7}, \frac{19}{8}, \frac{273}{11}, \frac{18}{29}$

(one from each like fraction bracket)

unit = $\frac{1}{8}$

mixed = no fraction(s)

non-integer = no fraction(s)

③ Convert as needed [mixed \leftrightarrow improper]

$$\frac{11}{8} = 1\frac{3}{8}$$

$$\begin{array}{r} 298 \\ \times 17 \\ \hline 2086 \\ 2980 \\ \hline 5066 \end{array}$$

$$298\frac{4}{17} = \frac{5070}{17}$$

$$2\frac{6}{11} = \frac{28}{11}$$

$$\frac{2786}{143} = 19\frac{69}{143}$$

$$\begin{array}{r} 19 \\ 143 \sqrt{2786} \\ \underline{-143} \\ 1356 \\ \underline{-1287} \\ 0069 \end{array} \quad \times 9 = 1287$$

④ Repeating decimal to fraction

$$① 11.738738738\ldots = \frac{11727}{999}$$

$$1000x = 11738.738738\ldots$$

$$x = 11.738738\ldots$$

$$\underline{999}x = \underline{11727.000000}$$

$$= \frac{11727}{999}$$

⑥ $67 \cdot 12383838\dots$

$$\begin{array}{r} - 100x = 67\overset{-1}{1}\overset{-1}{2}.\overset{3}{8}\overset{3}{8} \overset{3}{8}\overset{3}{8}\dots \\ x = \underline{67.\overset{1}{2}\overset{3}{8}\overset{3}{8}\overset{3}{8}\overset{3}{8}\dots} \\ 99x = 6645.26000000\dots \end{array}$$

$$99x = 6645.26$$

$$100x - 99x = 6645.26 \times 100$$

$$9900x = 664526$$

$$\begin{array}{r} x = \underline{664526} \\ 9900 \end{array}$$

⑤

$$2.8 + 3.042 = 5.842$$

$$\begin{array}{r}
 3.042 \\
 + 2.800 \\
 \hline
 5.842
 \end{array}
 \qquad
 \begin{array}{r}
 9.63 \\
 + 8.72 \\
 \hline
 18.35
 \end{array}$$

$$4.6 - 8.973 = -4.373$$

$$\begin{array}{r}
 8.973 \\
 - 4.600 \\
 \hline
 4.373
 \end{array}$$

$$9.63 + 8.72 = 18.35$$

$$= \frac{811}{100} \times \frac{323}{100} = \frac{811 \times 323}{10000}$$

$$8.11 \times 3.23 = 26.1953$$

$$\begin{array}{r}
 811 \\
 \times 323 \\
 \hline
 12433 \\
 16220 \\
 \hline
 243300 \\
 \hline
 261953 \\
 = 26.1953
 \end{array}$$

$$111.234 \div 2.81 = 39.058\dots$$

$$111.234 \div 2.81$$

$$= \frac{111234}{1000} \div \frac{281}{100}$$

$$= \frac{111234}{1000} \times \frac{100}{281}$$

$$= \frac{11123400}{281000}$$

$$\begin{array}{r} 39.058 \dots \\ \times 5 = 1405000 \\ \hline 190000 \\ 19123400.00 \\ \hline 843000 \\ \hline 026913400 \\ 2529000 \\ \hline 0164400 \\ \hline 1644000 \\ 1405000 \\ \hline 02390000 \\ \hline 2386000 \\ \hline 0004000 \end{array}$$

Expand:

⑥ $1.7381 \times 10^3 = 1738.1$

$$12.08 \times 10^{-4} = 0.001208$$

$$0.0127 \times 10^{-3} = 0.0000127$$

$$0.11 \times 10^2 = 11$$

Write in exponential notation

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$$189764.2385 = 1.897642385 \times 10^5 \\ = 1.897642385 \times 10^5$$

$$0.1123 = 1.123 \times 10^{-1} \\ = 1.123 \times 10^{-1}$$

$$0.00864 = 8.64 \times 10^{-3} \\ = 8.64 \times 10^{-3}$$

$$0.00000743 = 7.43 \times 10^{-6} \\ = 7.43 \times 10^{-6}$$