

calc_decimal_example

Student Group

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$\$I.\text{quad}\$$ Calculation example for decimal value

Idea: The number $\$2658.47\$$ is only the representation with the numerals $\$[0..9]\$,$ but what is the value behind it?

so lets start

```
\begin{align*} \begin{smallmatrix} \color{black}{\text{number}:} & \color{black}{\{ } & \color{black}{\}} & \color{black}{\{2\}} & \color{black}{\{6\}} & \color{black}{\{5\}} & \color{black}{\{8.\}} & \color{black}{\{4\}} & \color{black}{\{7\}} \\ \color{white}{\text{index}:} & \color{white}{\{i\}} & \color{white}{\{3\}} & \color{white}{\{2\}} & \color{white}{\{1\}} & \color{white}{\{0\}} & \color{white}{\{-1\}} & \color{white}{\{-2\}} \\ \color{white}{\text{place value}:} & \color{white}{\{B^i\}} & \color{white}{\{10^3\}} & \color{white}{\{10^2\}} & \color{white}{\{10^1\}} & \color{white}{\{10^0\}} & \color{white}{\{10^{-1}\}} & \color{white}{\{10^{-2}\}} \\ \color{white}{\text{numerals}:} & \color{white}{\{z_i\}} & \color{white}{\{2\}} & \color{white}{\{6\}} & \color{white}{\{5\}} & \color{white}{\{8\}} & \color{white}{\{4\}} & \color{white}{\{7\}} \\ \color{white}{\text{calc}.:} & \color{white}{\{z_i \cdot B^i\}} & \color{white}{\{2000\}} & \color{white}{\{600\}} & \color{white}{\{50\}} & \color{white}{\{8\}} & \color{white}{\{0.4\}} & \color{white}{\{0.07\}} \\ \color{white}{\text{result}:} & \color{white}{\{\sum_i z_i \cdot B^i\}} & \color{white}{\{2658.47\}} \end{smallmatrix} \end{align*}
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First: Put space between the numerals to see the thousands, hundreds, tens, ones, tenths, hundredths

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\begin{align*} \begin{smallmatrix} \color{black}{\text{number}:} & \color{black}{\{ } & \color{black}{\}} & \color{black}{\{2\}} & \color{black}{\{6\}} & \color{black}{\{5\}} & \color{black}{\{8.\}} & \color{black}{\{4\}} & \color{black}{\{7\}} \\ \color{blue}{\text{index}:} & \color{blue}{\{i\}} & \color{blue}{\{3\}} & \color{blue}{\{2\}} & \color{blue}{\{1\}} & \color{blue}{\{0\}} & \color{blue}{\{-1\}} & \color{blue}{\{-2\}} \\ \color{white}{\text{place value}:} & \color{white}{\{B^i\}} & \color{white}{\{10^3\}} & \color{white}{\{10^2\}} & \color{white}{\{10^1\}} & \color{white}{\{10^0\}} & \color{white}{\{10^{-1}\}} & \color{white}{\{10^{-2}\}} \\ \color{white}{\text{numerals}:} & \color{white}{\{z_i\}} & \color{white}{\{2\}} & \color{white}{\{6\}} & \color{white}{\{5\}} & \color{white}{\{8\}} & \color{white}{\{4\}} & \color{white}{\{7\}} \\ \color{white}{\text{calc}.:} & \color{white}{\{z_i \cdot B^i\}} & \color{white}{\{2000\}} & \color{white}{\{600\}} & \color{white}{\{50\}} & \color{white}{\{8\}} & \color{white}{\{0.4\}} & \color{white}{\{0.07\}} \\ \color{white}{\text{result}:} & \color{white}{\{\sum_i z_i \cdot B^i\}} & \color{white}{\{2658.47\}} \end{smallmatrix} \end{align*}
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Second: Write down the index for each position.

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\begin{align*} \begin{smallmatrix} \color{black}{\text{number}:} & \color{black}{\{ } & \color{black}{\}} & \color{black}{\{2\}} & \color{black}{\{6\}} & \color{black}{\{5\}} & \color{black}{\{8.\}} & \color{black}{\{4\}} & \color{black}{\{7\}} \\ \color{black}{\text{index}:} & \color{black}{\{i\}} & \color{black}{\{3\}} & \color{black}{\{2\}} & \color{black}{\{1\}} & \color{black}{\{0\}} & \color{black}{\{-1\}} & \color{black}{\{-2\}} \\ \color{blue}{\text{place value}:} & \color{blue}{\{B^i\}} & \color{blue}{\{10^3\}} & \color{blue}{\{10^2\}} & \color{blue}{\{10^1\}} & \color{blue}{\{10^0\}} & \color{blue}{\{10^{-1}\}} & \color{blue}{\{10^{-2}\}} \\ \color{white}{\text{numerals}:} & \color{white}{\{z_i\}} & \color{white}{\{2\}} & \color{white}{\{6\}} & \color{white}{\{5\}} & \color{white}{\{8\}} & \color{white}{\{4\}} & \color{white}{\{7\}} \\ \color{white}{\text{calc}.:} & \color{white}{\{z_i \cdot B^i\}} & \color{white}{\{2000\}} & \color{white}{\{600\}} & \color{white}{\{50\}} & \color{white}{\{8\}} & \color{white}{\{0.4\}} & \color{white}{\{0.07\}} \\ \color{white}{\text{result}:} & \color{white}{\{\sum_i z_i \cdot B^i\}} & \color{white}{\{2658.47\}} \end{smallmatrix} \end{align*}
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