

# calc\_decimal\_example

## Student Group

First Name	Surname	Matrikel Nr.

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\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}{} & \color{white}{} & \color{white}{1000} & \color{white}{100} & \color{white}{10} & \color{white}{1} & \color{white}{0.1} & \color{white}{0.01} \\
\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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\begin{align*} \begin{smallmatrix} \color{white}{\text{number:}} & \color{white}{} & \color{white}{2} & \color{white}{6} & \color{white}{5} & \color{white}{8.} & \color{white}{4} & \color{white}{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: But space between the numerals to see the thousands, hundreds, tens, ones, tenths, hundredths

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\begin{align*} \begin{smallmatrix} \color{blue}{\text{number:}} & \color{blue}{} & \color{blue}{2} & \color{blue}{6} & \color{blue}{5} & \color{blue}{8.} & \color{blue}{4} & \color{blue}{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{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{blue}{\text{numerals:}} & \color{blue}{z_i} & \color{blue}{2} & \color{blue}{6} & \color{blue}{5} & \color{blue}{8} & \color{blue}{4} & \color{blue}{7} \\ \color{blue}{\text{calc.:}} & \color{blue}{z_i \cdot B^i} & \color{blue}{2000} & \color{blue}{600} & \color{blue}{50} & \color{blue}{8} & \color{blue}{0.4} & \color{blue}{0.07} \\ \color{blue}{\text{result:}} & \color{blue}{\sum_i z_i \cdot B^i} & & & & & & \color{blue}{2658.47} \end{smallmatrix} \end{align*}

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

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$\backslash\text{color}\{\text{black}\}\{10^{-2}\}$   $\backslash\text{color}\{\text{black}\}\{\}$  &  $\backslash\text{color}\{\text{black}\}\{\}$  &  $\backslash\text{color}\{\text{black}\}\{1000\}$  &  $\backslash\text{color}\{\text{black}\}\{100\}$  &  $\backslash\text{color}\{\text{black}\}\{10\}$  &  $\backslash\text{color}\{\text{black}\}\{1\}$  &  $\backslash\text{color}\{\text{black}\}\{0.1\}$  &  $\backslash\text{color}\{\text{black}\}\{0.01\}$   $\backslash\text{color}\{\text{black}\}\{\text{numerals}:\}$  &  $\backslash\text{color}\{\text{black}\}\{z_i\}$  &  $\backslash\text{color}\{\text{black}\}\{2\}$  &  $\backslash\text{color}\{\text{black}\}\{6\}$  &  $\backslash\text{color}\{\text{black}\}\{5\}$  &  $\backslash\text{color}\{\text{black}\}\{8\}$  &  $\backslash\text{color}\{\text{black}\}\{4\}$  &  $\backslash\text{color}\{\text{black}\}\{7\}$   $\backslash\text{color}\{\text{black}\}\{\text{calc}:\}$  &  $\backslash\text{color}\{\text{black}\}\{z_i \cdot B^i\}$  &  $\backslash\text{color}\{\text{black}\}\{2000\}$  &  $\backslash\text{color}\{\text{black}\}\{600\}$  &  $\backslash\text{color}\{\text{black}\}\{50\}$  &  $\backslash\text{color}\{\text{black}\}\{8\}$  &  $\backslash\text{color}\{\text{black}\}\{0.4\}$  &  $\backslash\text{color}\{\text{black}\}\{0.07\}$   $\backslash\text{color}\{\text{black}\}\{\text{result}:\}$  &  $\backslash\text{color}\{\text{black}\}\{\sum_i z_i \cdot B^i\}$  & &  $\backslash\text{color}\{\text{black}\}\{2658.47\}$   $\backslash\text{end}\{\text{smallmatrix}\}$   $\backslash\text{end}\{\text{align}^*\}$  First: But space between the numerals to see the thousands, hundreds, tens, ones, tenths, hundredths

value		2	6	5	8 ,	4	7	
index	$\$i\$$	3	2	1	0	-1	-2	
$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$	$\$ \backslash\text{quad}\backslash\text{quad}\$$
value		2	6	5	8 ,	4	7	
index	$\$i\$$	3	2	1	0	-1	-2	
place value	$\$B^i\$$	$\$ \backslash\text{small}\{10^3\}\$$	$\$ \backslash\text{small}\{10^2\}\$$	$\$ \backslash\text{small}\{10^1\}\$$	$\$ \backslash\text{small}\{10^0\}\$$	$\$ \backslash\text{small}\{10^{-1}\}\$$	$\$ \backslash\text{small}\{10^{-2}\}\$$	
digit	$\$z_i\$$	2	6	5	8	4	7	
calc.	$\$z_i \cdot B^i\$$	2000	600	50	8	0.4	0.07	

Result  $\$ \backslash\text{sum}_i z_i \cdot B^i \$$  2658,47

aus (2+3)	$\$ \backslash\text{color}\{\text{blue}\}\{I_p\} = \backslash\text{color}\{\text{blue}\}\{I_m\} = 0 \$$	$\$I_p\$$ und $\$I_m\$$ sind damit definiert
aus (6)	$\$ \backslash\text{color}\{\text{blue}\}\{I_o\} = I_1 \$$	$\$I_o\$$ ist damit bekannt, wenn $\$I_1\$$ bekannt ist
aus (7) und (3)	$\$I_1 - I_2 - \backslash\text{color}\{\text{blue}\}\{0\} = 0 \$$	$\$ \backslash\text{quad}\$$
	$\$I_1 = I_2 = I_o\$$	$\$ \backslash\text{quad}\$$
	$\$ \backslash\text{color}\{\text{blue}\}\{I_1\} = \backslash\text{color}\{\text{blue}\}\{I_2\} = \backslash\text{color}\{\text{blue}\}\{I_o\} \$$	mit (8) und (9): $\$ \backslash\text{boxed}\{I_1\} = \backslash\text{frac}\{\backslash\text{boxed}\{I_1\}\}{\backslash\text{boxed}\{I_2\}} \$$ und (5)
	$\$ \backslash\text{frac}\{U_1\}{R_1} = \backslash\text{frac}\{U_2\}{R_2} = \backslash\text{frac}\{U_A\}{R_1 + R_2} \$$	Spannungsteilerformel, $\$I = \text{const.}\$$
(10)	$\$U_2 = U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} \$$	Spannungsteilerformel

## §II. Betrachtung der Spannungsverstärkung

aus (0)	$\$ \backslash\text{color}\{\text{blue}\}\{A_V\} = \backslash\text{frac}\{U_A\}\{U_E\} \$$	$\$ \backslash\text{quad}\$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{\backslash\text{color}\{\text{blue}\}\{U_E\}\} \$$	mit (4): $\$U_E = U_2 + U_D\$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{\backslash\text{color}\{\text{blue}\}\{U_2 + U_D\}\} \$$	$\$ \backslash\text{quad}\$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{\backslash\text{color}\{\text{blue}\}\{U_2 + U_D\}\} \$$	mit (10): $\$U_2 = U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} \$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{\backslash\text{color}\{\text{blue}\}\{U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} + U_D\}\} \$$	$\$ \backslash\text{quad}\$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} + U_D\} \$$	$\$ \backslash\text{quad}\$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} + \backslash\text{color}\{\text{blue}\}\{U_D\}\} \$$	mit (1)
	$\$A_V = \backslash\text{frac}\{U_A\}\{U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} + \backslash\text{frac}\{U_A\}\{A_D\}\} \$$	$\$ \backslash\text{quad}\$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} + \backslash\text{color}\{\text{blue}\}\{U_A\}\{A_D\}\} \$$	$\$ \backslash\text{quad}\$$
	$\$A_V = \backslash\text{frac}\{U_A\}\{U_A \cdot \text{frac}\{R_2\}{R_1 + R_2} + \backslash\text{frac}\{U_A\}\{A_D\}\} \$$	Erweitern mit $\$ \backslash\text{frac}\{1\}\{U_A\} \$$
	$\$A_V = \backslash\text{frac}\{1\}\{\backslash\text{frac}\{R_2\}{R_1 + R_2} + \backslash\text{frac}\{1\}\{A_D\}\} \$$	$\$ \backslash\text{quad}\$$

$A_V = \frac{1}{R_1 + R_2} + \frac{A_D}{R_1 + R_2}$	$\lim_{A_D \rightarrow \infty} \frac{1}{R_1 + R_2} = 0$
$A_V = \frac{1}{R_1 + R_2}$	Bruch umformen
$A_V = \frac{1}{R_1 + R_2}$	
$A_V = \frac{1}{R_1 + R_2}$	

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