

# calc\_decimal\_example

## Student Group

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### I. Calculation example for decimal value

value		2	6	5	8 ,	4	7
index	\$i\$	3	2	1	0	-1	-2
\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$
\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$
\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$
\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$	\$\quad\quad\$
value		2	6	5	8 ,	4	7
index	\$i\$	3	2	1	0	-1	-2
place value	\$B^i\$	$\$ \{ \text{small} \{ 10^3 \} \$$	$\$ \{ \text{small} \{ 10^2 \} \$$	$\$ \{ \text{small} \{ 10^1 \} \$$	$\$ \{ \text{small} \{ 10^0 \} \$$	$\$ \{ \text{small} \{ 10^{-1} \} \$$	$\$ \{ \text{small} \{ 10^{-2} \} \$$
digit	\$z_i\$	2	6	5	8	4	7
calc.	$\$ \{ \frac{z_i}{B^i} \}$	2000	600	50	8	0.4	0.07
Result	$\$ \{ \sum_i z_i \cdot B^i \}$	2658,47					
aus (2+3)		$\$ \{ \text{color} \{ \text{blue} \} \{ I_p \} = \text{color} \{ \text{blue} \} \{ I_m \} = 0 \$$			$\$ \{ I_p \$ \text{ und } \$ \{ I_m \$ \text{ sind damit definiert}$		
aus (6)		$\$ \{ \text{color} \{ \text{blue} \} \{ I_o \} = I_1 \$$			$\$ \{ I_o \$ \text{ ist damit bekannt, wenn } \$ \{ I_1 \$ \text{ bekannt ist}$		
aus (7) und (3)		$\$ \{ I_1 - I_2 - \text{color} \{ \text{blue} \} \{ 0 \} = 0 \$$			$\$ \{ \text{quad} \}$		
		$\$ \{ I_1 = I_2 = I_o \$$			$\$ \{ \text{quad} \}$		
		$\$ \{ \text{color} \{ \text{blue} \} \{ I_1 \} = \text{color} \{ \text{blue} \} \{ I_2 \} = \text{color} \{ \text{blue} \} \{ I_o \} \$$			mit (8) und (9): $\$ \{ \boxed{} \} = \text{frac} \{ U_{\boxed{} \} \} \{ R_{\boxed{} \} \} \$$ und (5)		
		$\$ \{ \text{frac} \{ U_1 \} \{ R_1 \} = \text{frac} \{ U_2 \} \{ R_2 \} = \text{frac} \{ U_A \} \{ R_1 + R_2 \} \$$			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)		$\$ \{ \text{color} \{ \text{blue} \} \{ A_V \} = \text{frac} \{ U_A \} \{ U_E \} \$$	
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ \text{color} \{ \text{blue} \} \{ U_E \} \} \$$	mit (4): $\$ \{ U_E = U_2 + U_D \$$
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ \text{color} \{ \text{blue} \} \{ U_2 + U_D \} \} \$$	
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ \text{color} \{ \text{blue} \} \{ U_2 \} + U_D \} \$$	mit (10): $\$ \{ U_2 = U_A \cdot \text{frac} \{ R_2 \} \{ R_1 + R_2 \} \$$
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ \text{color} \{ \text{blue} \} \{ U_A \cdot \text{frac} \{ R_2 \} \{ R_1 + R_2 \} \} + U_D \} \$$	
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ U_A \cdot \text{frac} \{ R_2 \} \{ R_1 + R_2 \} + U_D \} \$$	
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ U_A \cdot \text{frac} \{ R_2 \} \{ R_1 + R_2 \} + \text{color} \{ \text{blue} \} \{ U_D \} \} \$$	mit (1)
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ U_A \cdot \text{frac} \{ R_2 \} \{ R_1 + R_2 \} + \text{color} \{ \text{blue} \} \{ U_A \} \{ A_D \} \} \$$	
		$\$ \{ A_V = \text{frac} \{ U_A \} \{ U_A \cdot \text{frac} \{ R_2 \} \{ R_1 + R_2 \} + \text{frac} \{ U_A \} \{ A_D \} \} \$$	Erweitern mit $\$ \{ \text{frac} \{ 1 \} \{ U_A \} \$$
		$\$ \{ A_V = \text{frac} \{ 1 \} \{ \text{frac} \{ R_2 \} \{ R_1 + R_2 \} + \text{frac} \{ 1 \} \{ A_D \} \} \$$	
		$\$ \{ A_V = \text{frac} \{ 1 \} \{ \text{frac} \{ R_2 \} \{ R_1 + R_2 \} + \text{color} \{ \text{blue} \} \{ \text{frac} \{ 1 \} \{ A_D \} \} \} \$$	mit $\$ \{ \text{frac} \{ 1 \} \{ A_D \} \} \rightarrow 0 \$$
		$\$ \{ A_V = \text{frac} \{ 1 \} \{ \text{frac} \{ R_2 \} \{ R_1 + R_2 \} \} \$$	Bruch umformen
		$\$ \{ A_V = \text{frac} \{ R_1 + R_2 \} \{ R_2 \} \$$	

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Last update: **2021/09/15 01:48**

