

A9

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Berechne in \mathbb{Z}_{23} die folgenden Brüche:

- a. $\frac{1}{5^{21}}$ b. $\frac{1}{10^{13}}$ c. $\frac{7}{10^{12}}$ d. $\frac{7}{22}$

Es gilt: p Primzahl und $\bar{a} \in \mathbb{Z}_p$, $\bar{a} \neq \bar{0}$

$$\frac{1}{\bar{a}^k} = \bar{a}^{p-1-k}$$

$$a) \frac{1}{5^{21}} = 5^{23-1-21} = \underline{\underline{5}}$$

$$b) \frac{1}{10^{13}} = 10^{23-1-13} = 10^9$$

$$9 = (1001)_2$$

$$= 10^8 \cdot 10^1 = 10 \cdot 2 = \underline{\underline{20}}$$

$$10^1 = 10$$

$$10^2 = 100 = 8$$

$$10^4 = 64 = 18 = -5$$

$$10^8 = 25 = 2$$

$$c) \frac{7}{10^{12}} = 7 \cdot 10^{23-1-12} = 7 \cdot 10^{10} = 7 \cdot 10 \cdot 10^9$$

$$= 70 \cdot 20 = 1 \cdot 20 = \underline{\underline{20}}$$

$$d) \frac{7}{22} = \frac{7}{-1} = -7 = \underline{\underline{16}}$$