

Algebra-Aufgaben: Mengenlehre 2

1. Stelle die folgenden Mengen in der aufzählenden Form dar:

(a) $\{x \in \mathbb{N} \mid x \geq 24\} = \underline{\underline{\{24, 25, 26, \dots\}}}$

(b) $\{x \in \mathbb{N} \mid x < 12\} = \underline{\underline{\{1, 2, 3, \dots, 10, 11\}}}$

(c) $\{q \in \mathbb{N} \mid q < 12\} = \underline{\underline{\{1, 2, 3, \dots, 10, 11\}}}$

(d) $\{r \in \mathbb{N} \mid 0 < r < 33\} = \underline{\underline{\{1, 2, 3, \dots, 31, 32\}}}$

(e) $\{s \in \mathbb{N} \mid 0 \leq s < 34\} = \underline{\underline{\{1, 2, 3, \dots, 32, 33\}}}$

(f) $\{x \in \mathbb{N} \mid 2 \cdot x < 10\} = \underline{\underline{\{1, 2, 3, 4\}}}$

(g) $\{x \in \mathbb{N} \mid x \in \mathbb{V}_4\} = \underline{\underline{\{4, 8, 12, 16, \dots\}}}$

$\mathbb{T}_{100} = \{1, 2, 4, 5, 10, 20, 25, 50, 100\}$ (h) $\{t \in \mathbb{T}_{100} \mid t \leq 66\} = \underline{\underline{\{1, 2, 4, 5, 10, 20, 25, 50\}}}$

(i) $\{q \in \mathbb{N}_u \mid q < 45 \text{ und } q > 32\} = \underline{\underline{\{33, 35, 37, \dots, 41, 43\}}}$

$\mathbb{V}_4 = \{4, 8, 12, 16, 20, 24, 28, 32, 36, \dots\}$ (j) $\{y \in \mathbb{V}_4 \mid y \in \mathbb{V}_6 \text{ und } y \leq 64\} = \underline{\underline{\{12, 24, 36, 48, 60\}}}$

$\mathbb{V}_6 = \{6, 12, 18, 24, 30, 36, 42, \dots\}$

(k) $\{x \in \mathbb{N}_9 \mid x = 3 \cdot t, t \in \{1, 2, 3, \dots, 9\}\} = \{3, 2, 3, 4, \dots, 3, 8\} = \underline{\underline{\{6, 12, 18, 24\}}}$

(l) $\{w \in \mathbb{N}_9 \mid w = 4 \cdot t, t \in \{1, 2, 3, 4\}\} = \underline{\underline{\{4, 8, 12, 16\}}}$

(m) $\{a \in \mathbb{N} \mid a = 2 + 5 \cdot r, r \in \{10, 11, 12, 13, 14, 15\}\} = \underline{\underline{\{52, 57, 62, 67, 72, 77\}}}$

(n) $\{b \in \mathbb{N} \mid b = 3 + 5 \cdot r, r \in \{1, 2, 3, 4, 5\}\} = \underline{\underline{\{8, 13, 18, 23, 28\}}}$

(o) $\{c \in \mathbb{N} \mid c = 5 + 2 \cdot s, s \in \{12, 27, 54\}\} = \underline{\underline{\{29, 59, 113\}}}$

(p) $\{d \in \mathbb{N} \mid d = 5 + 2 \cdot s, r \in \{1, 2, 3 \dots 99, 100\}\} \quad \text{↯}$

(q) $\{s \in \mathbb{N} \mid 3 \cdot s \in \mathbb{T}_{12}\} = \underline{\underline{\{1, 2, 4\}}}$

(r) $\{l \in \mathbb{N} \mid 5 \cdot l \in \mathbb{T}_{12}\} = \underline{\underline{\{ \}}}$

$$(s) \{t \in \mathbb{N}_u \mid q^2 \in \mathbb{N}_g\} = \underline{\underline{\{1, 3, 5, 7, \dots\}}}$$

$$(t) \{h \in \mathbb{N} \mid h = h \cdot h\} = \underline{\underline{\{1\}}}$$

$$(u) \{k \in \mathbb{N}_0 \mid k = k \cdot k\} = \underline{\underline{\{0, 1\}}}$$

$$(v) \{e \in \mathbb{N} \mid 33 \cdot e + f > 22\} \quad \not\{ \}$$

$$(w) \{t \in \mathbb{N}_u \mid 45 < 5 \cdot t < 50\} = \underline{\underline{\{ \}}}$$

$$(x) \{g \in \mathbb{N} \mid 2 \cdot g = 1\} = \underline{\underline{\{ \}}}$$

2. Stelle die folgenden Mengen in der mathematisch beschreibenden Form dar:

$$(a) \{0, 1, 2, 3, 4, 5\} = \underline{\underline{\{x \in \mathbb{N}_0 \mid x \leq 5\}}}$$

$$(b) \{1, 2, 3, 4, 5\} = \underline{\underline{\{x \in \mathbb{N} \mid x < 6\}}}$$

$$(c) \{5, 6, 7, 8, 9\} = \underline{\underline{\{x \in \mathbb{N} \mid 4 < x \leq 9\}}}$$

$$(d) \{9, 8, 7, 6, 5\} = \underline{\underline{\{x \in \mathbb{N} \mid 4 < x \leq 9\}}}$$

$$(e) \{88, 89, 90, \dots, 12'345\} = \underline{\underline{\{x \in \mathbb{N} \mid 88 \leq x \leq 12'345\}}}$$

$$(f) \{45, 46, 47, \dots, 87, 88\} = \underline{\underline{\{q \in \mathbb{N} \mid 44 < q < 89\}}}$$

$$(g) \{22, 33, 44, \dots\} = \underline{\underline{\{x \in \mathbb{N}_n \mid x > 20\}}}$$

$$(h) \{5, 10, 15, \dots\} = \underline{\underline{\mathbb{V}_5}}$$

$$(i) \{9, 18, 27, \dots, 90\} = \underline{\underline{\{r \in \mathbb{V}_9 \mid r \leq 90\}}}$$

$$(j) \{12, 15, 18, 21, \dots\} = \underline{\underline{\{t \in \mathbb{V}_3 \mid t \geq 12\}}}$$

$$(k) \{1, 4, 9, 16, 25, \dots\} = \underline{\underline{\{y \in \mathbb{N} \mid y = n^2, n \in \mathbb{N}\}}}$$

- (l) $\{1, 17\} = \underline{\underline{\mathbb{N}_7^2}}$
- (m) $\{33, 36, 39, 42, 45, 48\} = \underline{\underline{\{x \in \mathbb{N}_0 \mid 33 \leq x < 50\}}}$
- (n) $\{7, 14, 21, 28, 35, 42, 49, \dots\} = \underline{\underline{\mathbb{N}_7^2}}$
- (o) $\{2, 10, 18, 26, \dots\} = \underline{\underline{\{s \in \mathbb{N} \mid s = 2 + t \cdot 8, t \in \mathbb{N}_0\}}}$
- (p) $\{4, 9, 14, 19, 24, \dots\} = \underline{\underline{\{c \in \mathbb{N} \mid c = 4 + r \cdot 5, r \in \mathbb{N}_0\}}}$
- (q) $\{3, 10, 17, 24, 31\} = \underline{\underline{\{d \in \mathbb{N} \mid d = 3 + t \cdot 7, d \leq 31\}}}$
- (r) $\{2, 7, 12, 17, \dots\} = \underline{\underline{\{e \in \mathbb{N} \mid e = 2 + q \cdot 5, q \in \mathbb{N}_0\}}}$
- (s) $\{11, 18, 25, 32, \dots, 711\} = \underline{\underline{\{v \in \mathbb{N} \mid v = 11 + t \cdot 7, t \in \{0, 1, 2, \dots, 63, 64\}\}}}$
- (t) $\{13, 25, 37, 49, \dots, 97\} = \underline{\underline{\{z \in \mathbb{N} \mid z = 1 + t \cdot 12, t \in \mathbb{N}, z < 100\}}}$
- (u) $\{2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31\} = \underline{\underline{\{x \in \mathbb{N} \mid x \text{ int prim}\}}}$