

1. Bestimme die kartesischen Produkte. (e) und (f) sind schwierig!

(a) $\{5, 7\} \times \{4, 6\} =$

(b) $\{8\} \times \{1, 2, 3\} =$

(c) $\{3, 4\} \times \{3, 4\} =$

(d) $\{a, b, c\} \times \{c, d\} =$

(e) $\{ \} \times \{1, 2, 3\} =$

(f) $\{1, 2\} \times \{3, 4\} \times \{5, 6\} =$

2. Bestimme die Mächtigkeiten der folgenden Mengen.

(a) $|\{1, 2, 3\} \times \{2, 3, 4, 5\}|$

(b) $|\{1, 2, 3, 4, 5, 6\} \times \{1, 2, 3, 4, 5, 6\}|$

(c) $|\{a, b, c, d\} \times \{u, v, w, x, y\}|$

(d) $|\mathbb{N} \times \mathbb{N}|$

(e) $|\{10, 20, 30, 40, 50\} \times \{ \}|$

(f) $|\{1, 2, 3\} \times \{4, 5\} \times \{6, 7, 8, 9\}|$

1. (a) $\{5, 7\} \times \{4, 6\} =$
 $\{(5, 4), (5, 6), (7, 4), (7, 6)\}$
- (b) $\{8\} \times \{1, 2, 3\} =$
 $\{(8, 1), (8, 2), (8, 3)\}$
- (c) $\{3, 4\} \times \{3, 4\} =$
 $\{(3, 3), (3, 4), (4, 3), (4, 4)\}$
- (d) $\{a, b, c\} \times \{c, d\} =$
 $\{(a, c), (a, d), (b, c), (b, d), (c, c), (c, d)\}$
- (e) $\{\} \times \{1, 2, 3\} =$
 $\{\}$
- (f) $\{1, 2\} \times \{3, 4\} \times \{5, 6\} =$
 $\{(1, 3, 5), (1, 3, 6), (1, 4, 5), (1, 4, 6), (2, 3, 5), (2, 3, 6), (2, 4, 5), (2, 4, 6)\}$
2. (a) $|\{1, 2, 3\} \times \{2, 3, 4, 5\}| = 3 \cdot 4 = 12$
- (b) $|\{1, 2, 3, 4, 5, 6\} \times \{1, 2, 3, 4, 5, 6\}| = 6 \cdot 6 = 36$
- (c) $|\{a, b, c, d\} \times \{u, v, w, x, y\}| = 4 \cdot 5 = 20$
- (d) $|\mathbb{N} \times \mathbb{N}| = \infty \cdot \infty = \infty$
- (e) $|\{10, 20, 30, 40, 50\} \times \{\}| = 5 \cdot 0 = 0$
- (f) $|\{1, 2, 3\} \times \{4, 5\} \times \{6, 7, 8, 9\}| = 3 \cdot 2 \cdot 4 = 24$