

Übungen zur **Mathematik I für Chemie, Life Science und Nanoscience**

Freiwillige Zusatzaufgaben zur **Vektorrechnung** (Teil 1)

**Lösungen**

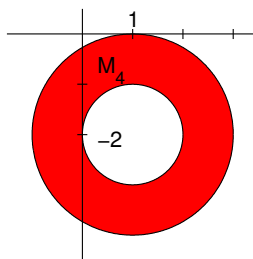
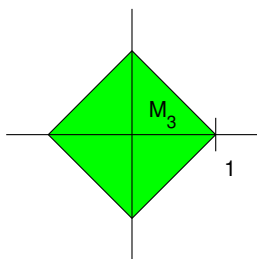
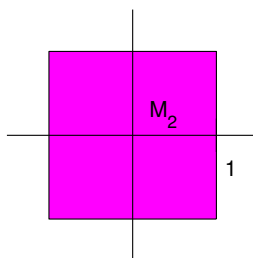
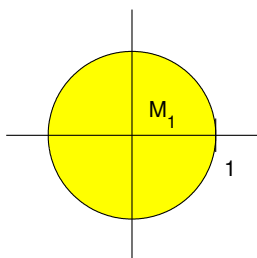
(1) (Maximum und Minimum)

$$\max\{5 - k : k = 2, 3, \dots, 10\} = 3, \quad \min\{5 - k : k = 2, 3, \dots, 10\} = -5,$$

$$\max\{|5 - k| : k = 2, 3, \dots, 10\} = 5, \quad \min\{|5 - k| : k = 2, 3, \dots, 10\} = 0,$$

$$\max\{x^3 - 1 : -2 \leq x \leq 2\} = 7, \quad \min\{x^3 - 1 : -2 \leq x \leq 2\} = -9.$$

(2) Es gelten die Beziehungen  $M_3 \subset M_1 \subset M_2$ .



- (3) a) linear abhängig  
b) linear abhängig  
c) linear unabhängig  
d) linear unabhängig

(4)  $\vec{a} \in U, \vec{b} \notin U, \vec{c} \notin U$ .

(5) a)  $\varphi = \frac{\pi}{2}$

b)  $\lambda = 1, \quad \vec{c}_1 \stackrel{A}{=} \frac{1}{6} \begin{pmatrix} -4 \\ 1 \end{pmatrix}$