S 80 Nr. 3

a) $\vec{AB} = \begin{pmatrix} b_1 - a_1 \\ b_2 - a_2 \\ b_3 - a_3 \end{pmatrix} = \begin{pmatrix} 3-1 \\ 4-0 \\ 1-1 \end{pmatrix} = \begin{pmatrix} 2 \\ 4 \\ 0 \end{pmatrix}$ b) $\vec{AB} = \begin{pmatrix} -1 \\ 1 \\ 3 \end{pmatrix}$

$\vec{BA} = \begin{pmatrix} a_1 - b_1 \\ a_2 - b_2 \\ a_3 - b_3 \end{pmatrix} = \begin{pmatrix} 1-3 \\ 0-4 \\ 1-1 \end{pmatrix} = \begin{pmatrix} -2 \\ -4 \\ 0 \end{pmatrix}$ $\vec{BA} = \begin{pmatrix} 1 \\ -1 \\ -3 \end{pmatrix}$

c) $\vec{AB} = \begin{pmatrix} 3 \\ -4 \\ 1 \end{pmatrix}$; $\vec{BA} = \begin{pmatrix} -3 \\ 4 \\ -1 \end{pmatrix}$ d) $\vec{AB} = \begin{pmatrix} 1 \\ -3 \\ -2 \end{pmatrix}$ $\vec{BA} = \begin{pmatrix} -1 \\ 3 \\ 2 \end{pmatrix}$

e) $\vec{AB} = \begin{pmatrix} 6 \\ 6 \\ -1 \end{pmatrix}$; $\vec{BA} = \begin{pmatrix} -6 \\ -6 \\ 1 \end{pmatrix}$ F) $\vec{AB} = \begin{pmatrix} 1{,}5 \\ -4{,}3 \\ 5 \end{pmatrix}$ $\vec{BA} = \begin{pmatrix} -1{,}5 \\ 4{,}3 \\ -5 \end{pmatrix}$

S 80 Nr 4

a) $\vec{OB}$ Ortsvektor vom Punkt B

$$\vec{OB} = \vec{OA} + \vec{AB} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} + \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 \\ -2 \\ 6 \end{pmatrix} \Rightarrow B(4|-2|6)$$

alternativ

$$\vec{AB} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} b_1 - 2 \\ b_2 - (-1) \\ b_3 - 3 \end{pmatrix} \Rightarrow \left.\begin{array}{l} b_1 - 2 = 2 \Rightarrow b_1 = 4 \\ b_2 + 1 = -1 \Rightarrow b_2 = -2 \\ b_3 - 3 = 3 \Rightarrow b_3 = 6 \end{array}\right\} \Rightarrow B(4|-2|6)$$

---

b) $\vec{AB} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} b_1 - (-17) \\ b_2 - 11 \\ b_3 - 31 \end{pmatrix} \Rightarrow \left.\begin{array}{l} b_1 + 17 = 2 \Rightarrow b_1 = -15 \\ b_2 - 11 = -1 \Rightarrow b_2 = 10 \\ b_3 - 31 = 3 \Rightarrow b_3 = 34 \end{array}\right\} \Rightarrow B(-15|10|34)$

---

c) $\vec{AB} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} -17 - a_1 \\ 11 - a_2 \\ 31 - a_3 \end{pmatrix} \Rightarrow \left.\begin{array}{l} -17 - a_1 = 2 \Rightarrow a_1 = -19 \\ 11 - a_2 = -1 \Rightarrow a_2 = 12 \\ 31 - a_3 = 3 \Rightarrow a_3 = 28 \end{array}\right\} \Rightarrow A(-19|12|28)$

---

d) $\vec{AB} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} 33 - a_1 \\ -71 - a_2 \\ -181 - a_3 \end{pmatrix} \Rightarrow \left.\begin{array}{l} 33 - a_1 = 2 \Rightarrow a_1 = 31 \\ -71 - a_2 = -1 \Rightarrow a_2 = -70 \\ -181 - a_3 = 3 \Rightarrow a_3 = -184 \end{array}\right\} \Rightarrow A(31|-70|-184)$