

Nr. 8 a) $\vec{OM}_{AB} = \vec{OA} + \frac{1}{2} \vec{AB} = \vec{OA} + \frac{1}{2} \cdot (\vec{OB} - \vec{OA}) = \frac{1}{2} \cdot (\vec{OA} + \vec{OB})$

$\Rightarrow M_{AB} \left(\frac{a_1+b_1}{2} \mid \frac{a_2+b_2}{2} \mid \frac{a_3+b_3}{2} \right)$ *Merken*

Für $A(-1 \mid 3 \mid 4)$, $B(1 \mid -3 \mid 4)$

$M_{AB} \left(\frac{-1+1}{2} \mid \frac{3+(-3)}{2} \mid \frac{4+4}{2} \right) = (0 \mid 0 \mid 4)$

b) $A(6 \mid 1 \mid -4)$ $B(3 \mid 1 \mid 6)$

$M_{AB} \left(\frac{6+3}{2} \mid \frac{1+1}{2} \mid \frac{-4+6}{2} \right) = (4,5 \mid 1 \mid 1)$

c) $B(7 \mid -4 \mid 1)$ $M_{AB}(1 \mid 2 \mid 5)$

$\Rightarrow \frac{a_1+7}{2} = 1$; $\frac{a_2+(-4)}{2} = 2$; $\frac{a_3+1}{2} = 5$

$a_1+7 = 2$; $a_2-4 = 4$; $a_3+1 = 10$

$a_1 = -5$; $a_2 = 8$; $a_3 = 9$

$A(-5 \mid 8 \mid 9)$

d) $A(2 \mid 5 \mid 3)$ $M_{AB}(5 \mid -1 \mid 2)$

$\frac{2+b_1}{2} = 5$; $\frac{5+b_2}{2} = -1$; $\frac{3+b_3}{2} = 2$

$2+b_1 = 10$; $5+b_2 = -2$; $3+b_3 = 4$

$b_1 = 8$; $b_2 = -7$; $b_3 = 1$

$B(8 \mid -7 \mid 1)$

oder $\vec{OB} = \vec{OA} + 2 \vec{AM}_{AB} = \vec{OA} + 2 \cdot (\vec{OM}_{AB} - \vec{OA})$

$\vec{OB} = -\vec{OA} + 2 \cdot \vec{OM}_{AB} = -\begin{pmatrix} 2 \\ 5 \\ 3 \end{pmatrix} + 2 \cdot \begin{pmatrix} 5 \\ -1 \\ 2 \end{pmatrix} = \begin{pmatrix} +8 \\ -7 \\ +1 \end{pmatrix}$

$B(8 \mid -7 \mid 1)$