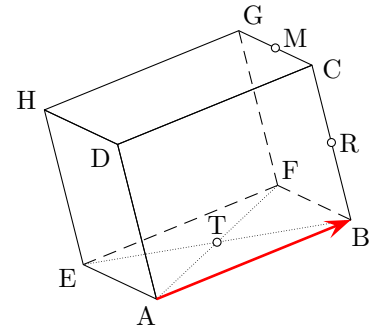
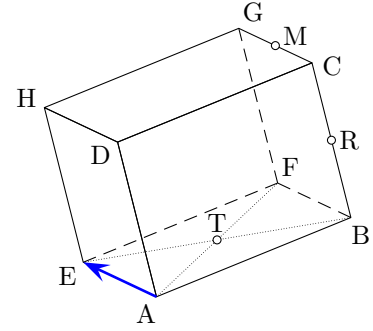


9.3

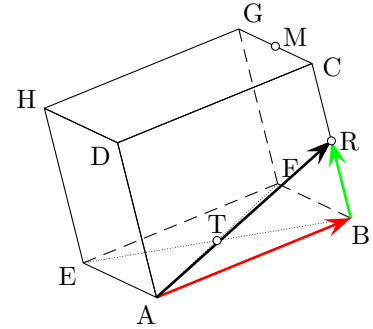
$$\begin{aligned}
 1) \quad (a) \quad \overrightarrow{AB} &= \overrightarrow{AB} \\
 &= 1 \cdot \overrightarrow{AB} + 0 \cdot \overrightarrow{AD} + 0 \cdot \overrightarrow{AE} \\
 &= \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}
 \end{aligned}$$



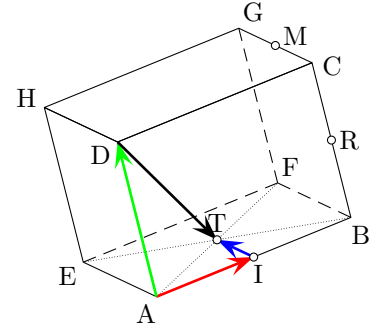
$$\begin{aligned}
 (b) \quad \overrightarrow{AE} &= \overrightarrow{AE} \\
 &= 0 \cdot \overrightarrow{AB} + 0 \cdot \overrightarrow{AD} + 1 \cdot \overrightarrow{AE} \\
 &= \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}
 \end{aligned}$$



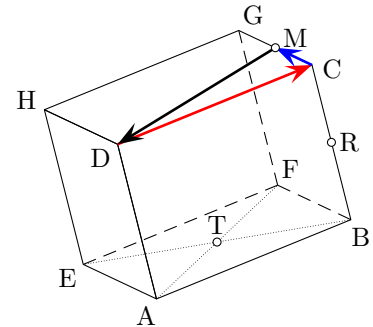
$$\begin{aligned}
 (c) \quad \overrightarrow{AR} &= \overrightarrow{AB} + \overrightarrow{BR} \\
 &= 1 \cdot \overrightarrow{AB} + \frac{1}{2} \cdot \overrightarrow{AD} + 0 \cdot \overrightarrow{AE} \\
 &= \begin{pmatrix} 1 \\ \frac{1}{2} \\ 0 \end{pmatrix}
 \end{aligned}$$



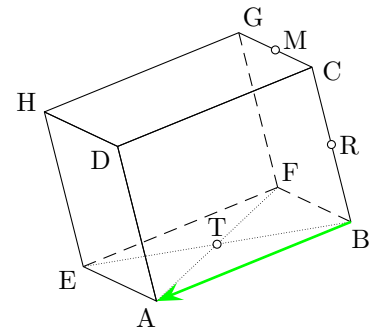
$$\begin{aligned}
 (d) \quad \overrightarrow{DT} &= \overrightarrow{DA} + \overrightarrow{AI} + \overrightarrow{IT} \\
 &= \frac{1}{2} \cdot \overrightarrow{AB} - 1 \cdot \overrightarrow{AD} + \frac{1}{2} \cdot \overrightarrow{AE} \\
 &= \begin{pmatrix} \frac{1}{2} \\ -1 \\ \frac{1}{2} \end{pmatrix}
 \end{aligned}$$



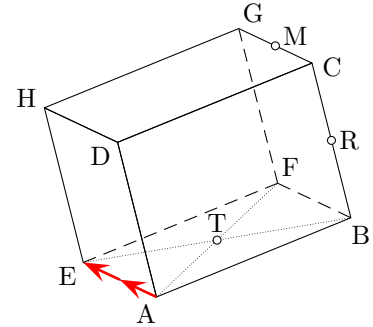
$$\begin{aligned}
 (e) \quad \overrightarrow{MD} &= \overrightarrow{MC} + \overrightarrow{CD} \\
 &= -1 \cdot \overrightarrow{AB} + 0 \cdot \overrightarrow{AD} - \frac{1}{2} \cdot \overrightarrow{AE} \\
 &= \begin{pmatrix} -1 \\ 0 \\ -\frac{1}{2} \end{pmatrix}
 \end{aligned}$$



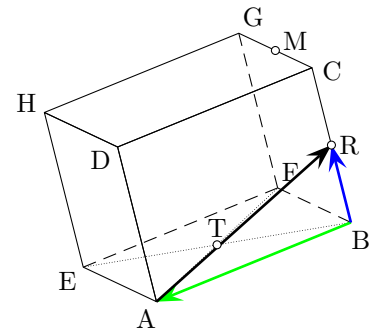
$$\begin{aligned}
 2) \quad (a) \quad \overrightarrow{AB} &= \overrightarrow{DC} \\
 &= 0 \cdot \overrightarrow{CM} - 1 \cdot \overrightarrow{CD} + 0 \cdot \overrightarrow{BR} \\
 &= \begin{pmatrix} 0 \\ -1 \\ 0 \end{pmatrix}
 \end{aligned}$$



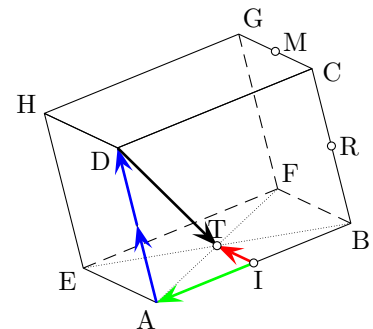
$$\begin{aligned}
 (b) \quad \overrightarrow{AE} &= \overrightarrow{CG} \\
 &= 2 \cdot \overrightarrow{CM} + 0 \cdot \overrightarrow{CD} + 0 \cdot \overrightarrow{BR} \\
 &= \begin{pmatrix} 2 \\ 0 \\ 0 \end{pmatrix}
 \end{aligned}$$



$$\begin{aligned}
 (c) \quad \overrightarrow{AR} &= \overrightarrow{AB} + \overrightarrow{BR} \\
 &= 0 \cdot \overrightarrow{CM} - 1 \cdot \overrightarrow{CD} + 1 \cdot \overrightarrow{BR} \\
 &= \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix}
 \end{aligned}$$



$$\begin{aligned}
 (d) \quad \overrightarrow{DT} &= \overrightarrow{DA} + \overrightarrow{AI} + \overrightarrow{IT} \\
 &= 1 \cdot \overrightarrow{CM} - \frac{1}{2} \cdot \overrightarrow{CD} + -2 \cdot \overrightarrow{BR} \\
 &= \begin{pmatrix} 1 \\ -\frac{1}{2} \\ -2 \end{pmatrix}
 \end{aligned}$$



$$\begin{aligned}
 (e) \quad \overrightarrow{MD} &= \overrightarrow{MC} + \overrightarrow{CD} \\
 &= -1 \cdot \overrightarrow{CM} + 1 \cdot \overrightarrow{CD} + 0 \cdot \overrightarrow{BR} \\
 &= \begin{pmatrix} -1 \\ 1 \\ 0 \end{pmatrix}
 \end{aligned}$$

