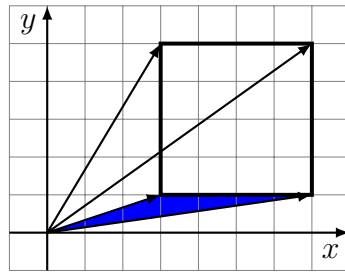
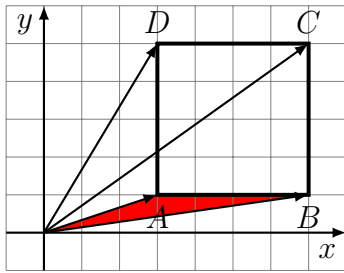


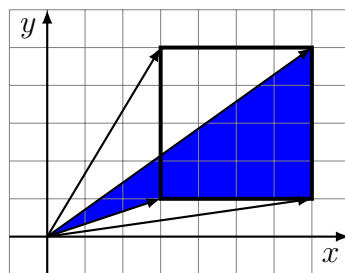
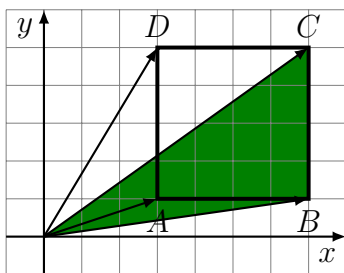
## Flächenberechnung ebener Polygone (eine Anwendung des Vektorprodukts)

Gegeben: Quadrat  $ABCD$  mit  $A(3, 1)$ ,  $B(7, 1)$ ,  $C(7, 5)$  und  $D(3, 5)$ .

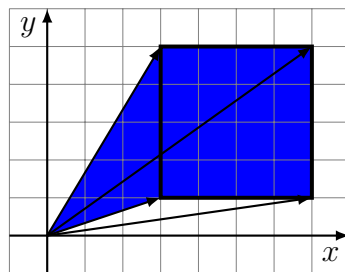
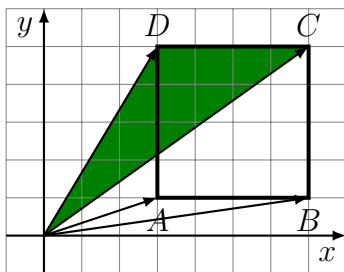
Gesucht: Flächeninhalt



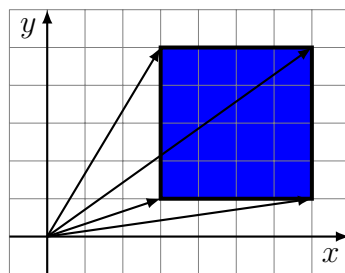
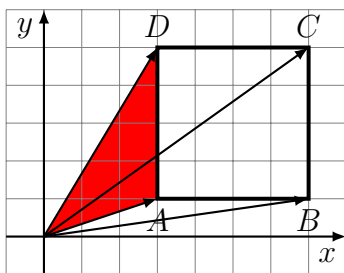
$$F_{AB} = \frac{1}{2} \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix} \times \begin{pmatrix} 7 \\ 1 \\ 0 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 0 \\ 0 \\ -4 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ -2 \end{pmatrix} \quad F_1 = -2$$



$$F_{BC} = \frac{1}{2} \begin{pmatrix} 7 \\ 1 \\ 0 \end{pmatrix} \times \begin{pmatrix} 7 \\ 5 \\ 0 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 0 \\ 0 \\ 28 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 14 \end{pmatrix} \quad F_2 = F_1 + 14 = 12$$



$$F_{CD} = \frac{1}{2} \begin{pmatrix} 7 \\ 5 \\ 0 \end{pmatrix} \times \begin{pmatrix} 3 \\ 5 \\ 0 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 0 \\ 0 \\ 20 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 10 \end{pmatrix} \quad F_3 = F_2 + 10 = 22$$



$$F_{DA} = \frac{1}{2} \begin{pmatrix} 3 \\ 5 \\ 0 \end{pmatrix} \times \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 0 \\ 0 \\ -12 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ -6 \end{pmatrix} \quad F_4 = F_3 - 6 = 16$$