Lösungen: Schnittwinkel S. 255 f. VII.6 : $\boxed{\text{Geo13}}$

Nr.1 a) 17,5° b) 30,2° c) 59,7° d) 88,1°

Nr.2 a) 14,7° b) 55,5° c) 70,8° d) 90°

Nr.3 a) 46,8° b) 90° c) 0° d) 0°

Nr.4 a) 26,6° b) parallel zur x_1x_2 Ebene; 26,6° zur x_1x_3-Ebene; 63,4° zur x_2x_3 E.

Nr.6 a) kein SP b) $S(2|2|4)$ $\alpha = 13,3°$ c) kein SP d) $S(2|2|6)$ $\alpha = 90°$

Nr.7 Winkel zwischen $\vec{a}$ und $\vec{b}$ 60° 90° 120°
a)+b) 60° 90° 60°
c) 30° 0° 30°

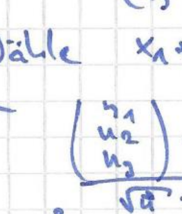
Nr.8 a) $\sphericalangle(\overline{AD}, E) = 60,8°$ $\sphericalangle(\overline{BD}, E) = 44,1°$ $\sphericalangle(\overline{CD}, E) = 76°$
b) $\sphericalangle(\overline{AC}, E) = 43,3°$ $\sphericalangle(\overline{BC}, E) = 25,7°$ $\sphericalangle(\overline{CD}, E) = 28,1°$
c) 76° d) 37,5°

Nr.9 a) z.B. $g: \vec{x} = \begin{pmatrix}-3\\2\\5\end{pmatrix} t$ $h: \vec{x} = \begin{pmatrix}4\\2\\7\end{pmatrix} \cdot t$
b) $E: -3x_1 + 2x_2 + 5x_3 = 0$ $F: 4x_1 + 2x_2 + 7x_3 = 0$
c) $g: \vec{x} = t \cdot \begin{pmatrix}-3\\2\\5\end{pmatrix}$ $E: \vec{x} = \begin{pmatrix}4\\2\\7\end{pmatrix} \cdot t + s \cdot \begin{pmatrix}4\\41\\-14\end{pmatrix}$; $\begin{pmatrix}4\\41\\-14\end{pmatrix} = \begin{pmatrix}-3\\2\\5\end{pmatrix} \times \begin{pmatrix}4\\2\\7\end{pmatrix}$

Nr.10 a) $\cos\alpha = |\vec{u}_0 \cdot \vec{v}_0|$ $\cos\alpha = |\vec{n}_{10} \cdot \vec{n}_{20}|$ $\sin\alpha = |\vec{u}_0 \cdot \vec{n}_0|$

Nr.11 a) 90° b) 45° c) 45°

Nr.12 a) Koord. Hinterlinksunten: $A(0|0|0)$ $B(0|1|0)$ $C(1/2|1/2|1)$
$D(1|1|0)$ $E_{ADC}: x_1 - \frac{1}{2}x_3 = 0$ $\alpha = \underline{63,4°}$
b) $E_{BCD}: \vec{n} = \begin{pmatrix}0\\-1\\-1/2\end{pmatrix}$ $\alpha = \underline{78,5°}$

Nr.13 

$A(0|0|0)$ $B(0|5|0)$ $C(5|5|0)$ $D(5|0|0)$ $S(2,5|2,5|6)$
$E_{ADS}: \vec{n} = \begin{pmatrix}12\\0\\-5\end{pmatrix}$ $\alpha = \underline{67,4°}$ b) $E_{BCS}: \vec{n} = \begin{pmatrix}0\\12\\5\end{pmatrix}$
$\alpha = \underline{81,5°}$

Nr.14 $\vec{n} = \begin{pmatrix}a_1\\a_2\\a_3\end{pmatrix}$ $b = 0$ $\cos\alpha = \frac{\left|\begin{pmatrix}a_1\\a_2\\a_3\end{pmatrix} \cdot \begin{pmatrix}0\\0\\1\end{pmatrix}\right|}{\sqrt{a_1^2 + a_2^2 + a_3^2}} = \ldots \Rightarrow a_1 = a_2 = a_3$
Wähle $x_1 + x_2 + x_3 = 0$ $\alpha = \underline{54,7°}$

Nr.15 $\frac{\begin{pmatrix}u_1\\u_2\\u_3\end{pmatrix} \cdot \begin{pmatrix}3\\0\\4\end{pmatrix}}{\sqrt{1} \cdot 5} = \cos 30° = \frac{\sqrt{3}}{2}$ und $\vec{u} \perp \begin{pmatrix}4\\0\\-3\end{pmatrix}$ $\Rightarrow$ $3u_1 + 4u_3 = \frac{5}{2}\sqrt{3}$ $|\vec{u}| = 1$
$4u_1 - 3u_3 = 0$
$\Rightarrow u_1 = \frac{3}{4}u_3$ $u_3 = \frac{2}{5}\sqrt{3}$ $u_1 = \frac{3}{10}\sqrt{3}$ $u_2 = \pm 1/2$ $\vec{u} = \begin{pmatrix}3/10\sqrt{3}\\ \pm 1/2\\ 2/5\sqrt{3}\end{pmatrix} \xrightarrow{\cdot\sqrt{3} \cdot 10} \begin{pmatrix}9\\ \pm 5\sqrt{3}\\ 12\end{pmatrix}$
$9x_1 \pm 5\sqrt{3}\,x_2 + 12x_3 = 0$

Nr.16 $\sin 45° = \frac{\begin{pmatrix}3\\4\\c\end{pmatrix} \cdot \begin{pmatrix}0\\0\\1\end{pmatrix}}{\sqrt{25 + c^2}}$
$c = \pm 5$ b) Die Schnittp. bilden einen Kreis mit Radius 5

Nr.17 Wähle $A(10|10|-10)$
$B(-10|-10|-10)$ $F(-10|10|10)$
$H(10|-10|10)$ $\alpha = \underline{70,5°}$
$E_{ADF}: \vec{n} = \begin{pmatrix}-1\\1\\-1\end{pmatrix}$ $E_{ADH}: \vec{n} = \begin{pmatrix}-1\\1\end{pmatrix}$