Passlt22

1. $g: \vec{x} = \begin{pmatrix}10\\20\\30\end{pmatrix} + t\begin{pmatrix}-2\\1\\2\end{pmatrix}$ $\quad P(30|-20|70)$

a) $P = g$ falsch, also $P \notin g$

$A(10|20|30)$ $\quad \vec{AP} = \begin{pmatrix}20\\-40\\40\end{pmatrix} \sim \begin{pmatrix}1\\-2\\2\end{pmatrix}$ $\quad E: \vec{x} = \begin{pmatrix}10\\20\\30\end{pmatrix} + t\begin{pmatrix}-2\\1\\2\end{pmatrix} + s\begin{pmatrix}1\\-2\\2\end{pmatrix}$

$\vec{n} = \begin{pmatrix}-2\\1\\2\end{pmatrix} \times \begin{pmatrix}1\\-2\\2\end{pmatrix} = \begin{pmatrix}-6\\-6\\-3\end{pmatrix} \sim \begin{pmatrix}2\\2\\1\end{pmatrix}$ $\quad E: 2\cdot 30 + 2\cdot(-20) + 1\cdot 70 + d = 0$

$\underline{E: 2x + 2y + z - 90 = 0}$

b) $A(x|y|10) \in g: \quad 10 = 30 + 2t, \quad t = -10$ $\quad A(30|10|10)$ $\quad \vec{AP} = \begin{pmatrix}0\\-30\\60\end{pmatrix}$

$\underline{d = |\vec{AP}| = 30\cdot\sqrt{5}}$

c) x-Achse: $y = z = 0$: $\underline{x = 45}$

$\underline{D(45|0|0)}$ $\quad |\overline{OD}| = 45$

$P(30|-20|70)$ $\quad |\overline{OP}| = 10\cdot\sqrt{62}$ ← größte Seite

$\vec{DP} = \begin{pmatrix}-15\\-20\\70\end{pmatrix}$ $\quad |\overline{DP}| = 5\cdot\sqrt{221}$ $\quad \measuredangle D: \delta$

$\cos\delta = \frac{\vec{DP}\cdot\vec{DO}}{DP\cdot DO} = \frac{675}{5\sqrt{221}\cdot 45} = 0{,}2018$ $\quad \underline{\delta = 78{,}36°}$

2. $f(x) = 1{,}5\cdot\cos(0{,}5x) \quad x \in I = [-4;10]$

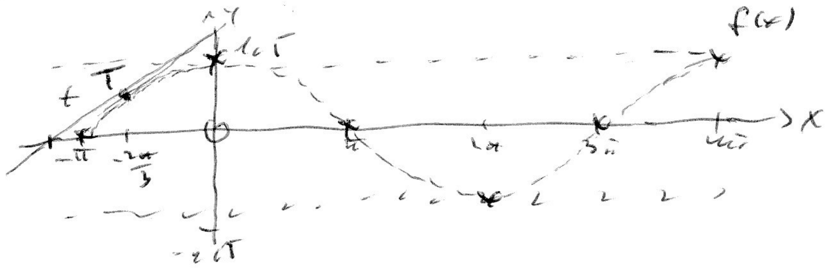
a) $0{,}5x$: Periode 4π, Streckung in x mit Faktor 2 } lineare Transf. erhält Extr., WP...

$1{,}5\cos..$: Amplitude 1,5: " y " 1,5

NSt | WP $\cos x$: $\frac{\pi}{2} + z\cdot 2\pi$, $\frac{3\pi}{2} + z\cdot 2\pi$ $\xrightarrow{0{,}5x}$ $\underline{\pi + z\cdot 4\pi}$, $\underline{3\pi + z\cdot 4\pi}$

Extr. $\cos x$: $0 + z\cdot 2\pi$, $\pi + z\cdot 2\pi$ $\xrightarrow{0{,}5x}$ $\underline{0 + z\cdot 4\pi}$, $\underline{2\pi + z\cdot 4\pi}$ | $\underline{y = \pm 1{,}5}$

$y = \pm 1$



b) $\int_{\pi}^{2\pi} 1{,}5\cos(\tfrac{1}{2}x)\,dx = 1{,}5\left[2\sin(\tfrac{1}{2}x)\right]_{\pi}^{2\pi} = 3\cdot(\sin\pi - \sin\tfrac{\pi}{2}) = \underline{-3}$

c) $f(-\frac{2\pi}{3}) = \frac{3}{2}\cos(-\frac{\pi}{3}) = \frac{3}{4}$ $\quad T(-\frac{2\pi}{3}|\frac{3}{4})$

$f'(x) = -\frac{3}{4}\sin(\frac{1}{2}x)$ $\quad f'(-\frac{2\pi}{3}) = -\frac{3}{4}\cdot\sin(-\frac{\pi}{3}) = \frac{3}{8}\sqrt{3}$

$t: y = \frac{3}{8}\sqrt{3}(x + \frac{2\pi}{3}) + \frac{3}{4} \stackrel{!}{=} 0$

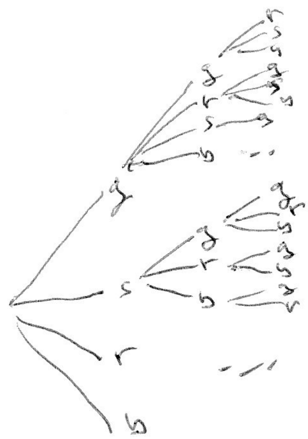
$\underline{x = -\frac{2}{3}(\sqrt{3} + \pi)}$

Pass H22

3. 2g | 1s | 1r | 1b ; 5

a) $P(\text{blau}) = \underline{\frac{1}{5}}$

b) $P(g \vee r) = \underline{\frac{3}{5}}$



2 mal z. m. Z.

c) $P(\text{2 gleiche}) = \left(\frac{2}{5}\right)^2 + 3\cdot\left(\frac{1}{5}\right)^2 = \underline{\frac{7}{25}}$

3 mal z. o. Z.

d) $P(\text{verschieden F}) = \frac{2\cdot1\cdot1}{5\cdot4\cdot3}\cdot 6 = \underline{\frac{1}{5}}$

e) $P(\text{mind. ein grün})$
$= 1 - P(\text{kein grün}) = 1 - \frac{1\cdot1\cdot1}{5\cdot4\cdot3}\cdot 6 = \underline{\frac{9}{10}}$

4.1. $c = 12$

a) $\alpha = \frac{3}{4}\beta$ $\quad \alpha + \beta = 90°$ $\quad \beta = \frac{360°}{7}$

$b = c\cdot\sin\beta = \underline{12\cdot\sin\left(\frac{360°}{7}\right) \approx 9{,}38}$

$a = c\cdot\cos\beta = \underline{12\cdot\cos\left(\frac{360°}{7}\right) \approx 7{,}48}$

b) $b = 2a$: $\quad a^2 + b^2 = c^2$ $\quad \underline{a = \frac{12}{5}\sqrt{5}}$

$\cos\beta = \frac{a}{c} = \frac{\sqrt{5}}{5}$ $\quad \underline{\beta = 63{,}4°}$

4.2. $f: (1+x^2)(x-3) \to \max$

$f': 2x(x-3) + (1+x^2)\cdot 1 = 0$

$3x^2 - 6x + 1 = 0$

$x_{1,2} = \frac{3\pm\sqrt{6}}{3}$

$f'': 6x - 6 \mid x_2$ negativ $\to$ Max. $\underline{x = \frac{3-\sqrt{6}}{3}}$

4.3. $\frac{1}{4}(x^2+8x+8) = \frac{1}{4}x^4 - \frac{1}{2}x^2 + 2x + 1$

$x^4 - 3x^2 - 4 = 0$

$(x^2-4)(x^2+1) = 0$ ↯

$\underline{x = \pm 1}$

2 Lösungen