Pass 417

1. $A(9|2)$

$(x-R)^2+(y-R)^2=R^2$

$(9-R)^2+(2-R)^2=R^2$

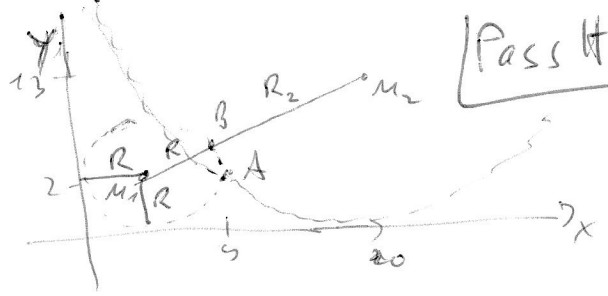
$R_2=5 \quad R_1=17 \quad M_1(5|15)$

$M_2(20|13)$

$m_{M_1M_2}=17$

$\overrightarrow{M_1B}=\text{da}\ 5\cdot\frac{1}{17}\overrightarrow{M_1M_2}=\frac{5}{17}\begin{pmatrix}15\\8\end{pmatrix}$ $\quad \vec{r}_B=\begin{pmatrix}5\\5\end{pmatrix}+\frac{5}{17}\begin{pmatrix}15\\8\end{pmatrix}=\frac{1}{17}\begin{pmatrix}160\\125\end{pmatrix}$

$B(9{,}41|7{,}35)$



2. $f(x)=e^{ax}$

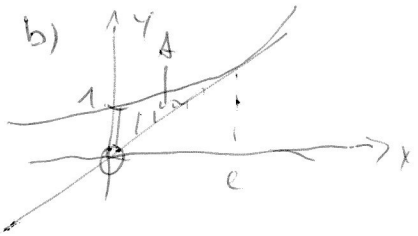
a) I $f=g \rightarrow e^{ax}=x$

II $f'=g' \rightarrow ae^{ax}=1 \rightarrow e^{ax}=\frac{1}{a}$

$\left.\begin{matrix}\\\\\end{matrix}\right\} x=\frac{1}{a} \rightarrow e^{ax}=e^1=x=y$

$a=\frac{1}{x}=e^{-1}$

b)



$A=\int_0^e (f-g)\,dx=\left[\frac{1}{a}e^{ax}-\frac{1}{2}x^2\right]_0^e=\left[\frac{1}{e}e^{x\cdot e}-\frac{1}{2}x^2\right]_0^e$

$A=\frac{e^2}{2}-e$

c) Kein gemeinsamer Punkt für $a>\frac{1}{e}$

ein " " " $a=\frac{1}{e}$

zwei " " " $a<\frac{1}{e}$ $\left.\begin{matrix}\\\\\end{matrix}\right\}$ und $a>0$

$a=0$: $f(x)=1$: ein gemeinsam Punkt

$a<0$: fallende e-Fkt : " " "

3. a) nur I: $50-20=30$

" F: $60-10=40$

I + F $\quad 20$

90

Keine: $125-90=35$

b) $P(I \vee F \text{ nicht } I+F)=\frac{30+40}{125}=\frac{70}{125}=56\%$

c) nicht F: $\left.\begin{matrix}I\,(30)\\K\,(35)\end{matrix}\right\}$ 65 $\quad P(I \mid \bar{F})=\frac{30}{65}=46{,}2\%$

d) stat. unabhängig $\quad P(I)\cdot P(F)=P(I\cap F)$

$\frac{30}{125}\cdot\frac{40}{125}=\frac{20}{125}$

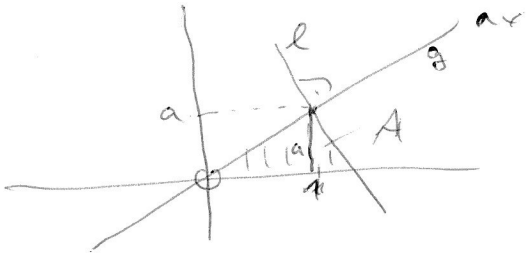
$16\% = 7{,}68\%$ (F)

nicht stat. unabhängig

Pass H17

4 a) g: $y = ax$

$P(1|a)$



$l: y = a - \frac{1}{a}(x-1) + a$

$l = 0$

$x = 1 + a^2$

$A = \frac{1}{2} \cdot (1+a^2) \cdot a$

b) $\vec{a} = \begin{pmatrix} x \\ -2x \end{pmatrix}$ $\vec{b} = \begin{pmatrix} x^2 \\ 4+x \end{pmatrix}$

1. $\vec{a} \cdot \vec{b} = 0$

$x^3 - 2x(4+x) = 0$

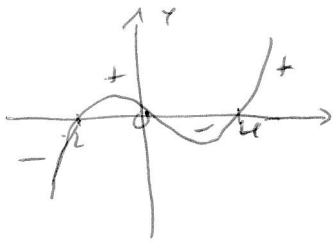
$x(x^2 - 8 - 2x) = 0$

$x = 0$

$x_1 = -2$

$x_3 = 4$

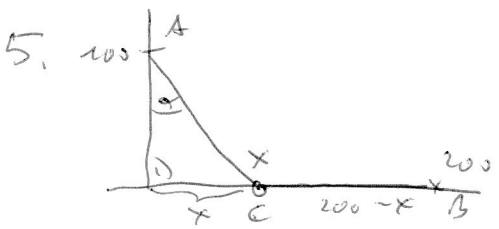
2. α spitz $\Leftrightarrow$ $\cos\alpha$ positiv $\rightarrow \vec{a} \cdot \vec{b} > 0$



$x(x+2)(x-4) > 0$

$x \in]-2; 0[\cup]4; \infty[$

5.



Energieverbrauch $= 0{,}2 \cdot BC + 0{,}3 \cdot AC =$

$E = 0{,}2 \cdot (200 - x) + 0{,}3 \cdot \sqrt{100^2 + x^2} \rightarrow \min$

$x \in [0; 200]$

$E' = -0{,}2 + \frac{0{,}3x}{\sqrt{x^2 + 10000}} = 0$

$0{,}3^2 x^2 = 0{,}2^2 (x^2 + 10000)$

$x = 89{,}4 \in \mathbb{D}$

VZT	x	80	89,4	90
$\alpha E(x)$		−	0	+
		↘	→ min	↗

Ränder:

$E(89{,}4) = 62{,}4$

$E(0) = 70$

$E(200) = 67{,}1$

$\} > E(89{,}4)$

$\tan\alpha = \frac{89{,}4}{100}$

$\alpha = 41{,}8°$