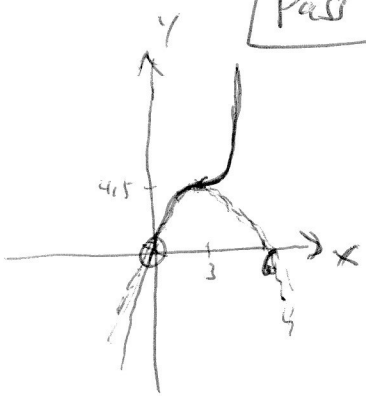
Pass F19

1. a) $f(x) = 0$ $\quad f'(x) = 0$ $\quad f'' = 0$

$x = 0$ $\quad x = 3$ doppelt, Te. P. $\quad x = 3$

$y = \frac{9}{2}$ $\quad$ WP $\quad y = \frac{9}{2}$



b) $WP(3|\frac{9}{2})$ $\}$ Symm. (6|0)
$(0|0)$

$p(x) = -\frac{1}{2} \cdot x(x-6)$

c) $d(x) = f(x) - p(x) = \frac{1}{6}x(x^2 - 6x + 9)$

$d'(x) = \frac{1}{2}x^2 - 2x + \frac{3}{2} = 0$

$x_1 = 1$ $\quad d(1) = \frac{2}{3}$

$x_2 = 3$

2. a) $A: \begin{pmatrix} x \\ 0 \end{pmatrix} = r$ $\quad t = -4$ $\quad x = 60$ $\quad A(60|0)$

$B: \begin{pmatrix} 0 \\ y \end{pmatrix} = r$ $\quad t = -16$ $\quad y = -12$ $\quad B(0|-12)$

b) $\vec{AB} = \begin{pmatrix} 60 \\ 12 \end{pmatrix}$ $\quad \vec{n}_{AB} = \begin{pmatrix} 12 \\ -60 \end{pmatrix}$

$\vec{r}_C = \vec{r}_B + \vec{n}_{AB} = \begin{pmatrix} 12 \\ -72 \end{pmatrix}$ $\quad C(12|-72)$

$\vec{r}_D = \vec{r}_A + \vec{n}_{AB} = \begin{pmatrix} 72 \\ -60 \end{pmatrix}$ $\quad D(72|-60)$

c) $\vec{r}_M = \frac{1}{2}(\vec{r}_B + \vec{r}_D) = \begin{pmatrix} 36 \\ -36 \end{pmatrix}$ $\quad h: y = -x$

d) $AB: y = \frac{1}{5}x - 12$ $\quad AB \cap h \Rightarrow E(10|-10)$

$CD: y = \frac{1}{5}x - \frac{377}{5}$ $\quad CD \cap h \to F(62|-62)$

$A_{OABCD} = \frac{1}{2} 60 \cdot 12 + (60^2 + 12^2) = 360 + 3744 = 4104$

$A_{OEFDA} = \frac{1}{2} 60 \cdot 10 + \frac{1}{2} A_{ABCD} = 300 + \frac{1}{2}(60^2 + 12^2) = 2172$ $\quad \frac{181}{161}$

$A_{OBCF} = 1932$

3.

		O	F	B
M	70	28	20	22
F	280	14	230	36
	350	42	250	58

a) 36

b) $P = \frac{250}{350} \cdot \frac{249}{349} = 50{,}96\%$

c) i) $P(M \cap O) = \left(\frac{28}{350}\right)^3 + \left(\frac{230}{350}\right)^3 = 28{,}4\%$ (mit zurücklegen)

ohne zurücklegen:

$\frac{28 \cdot 27 \cdot 26 + 250 \cdot 229 \cdot 228}{350 \cdot 349 \cdot 348}$

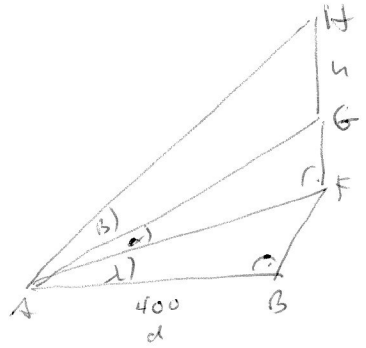
$\approx 28{,}3\%$

ii) $P(\text{drei Buchst.}) = 6 \cdot \frac{42}{350} \cdot \frac{250}{350} \cdot \frac{58}{350} = 86\%$

d) $P(3 \text{ Frauen Antwort}) = \frac{14}{42} \cdot \frac{250}{250} \cdot \frac{36}{58} = 19{,}03\%$

PossFig9

4,1.



$\alpha = 15°$
$\beta = 7°$
$\gamma = 21°$

$AF = \frac{d}{\cos\gamma} = 441{,}4$

$(AG = \frac{AF}{\cos\alpha} = 456{,}92)$

$FH = AF \cdot \tan(\alpha+\beta) = 178{,}34$

$GF = AF \cdot \tan\alpha = 118{,}27$

$h = 60\,m$

4,2. $y = a \cdot e^{-bx}$; $x > 0$

$y' = -ab\,e^{-bx}$

$y(\ln 2) = 2$: $a e^{-b\cdot\ln 2} = 2$

$y'(\ln 2) = 4$: $-ab\,e^{-b\cdot\ln 2} = 4$

$-2b = 4$

$b = -2$

$a = 2e^{+b\cdot\ln 2} = 2e^{-2\cdot\ln 2} = 2(e^{\ln 2})^{-2} = 2\cdot 2^{-2} = \frac{1}{2}$