Pass H12
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1. $f(x) = x^2 - 4x + 5$ $\qquad$ $S(2|1)$

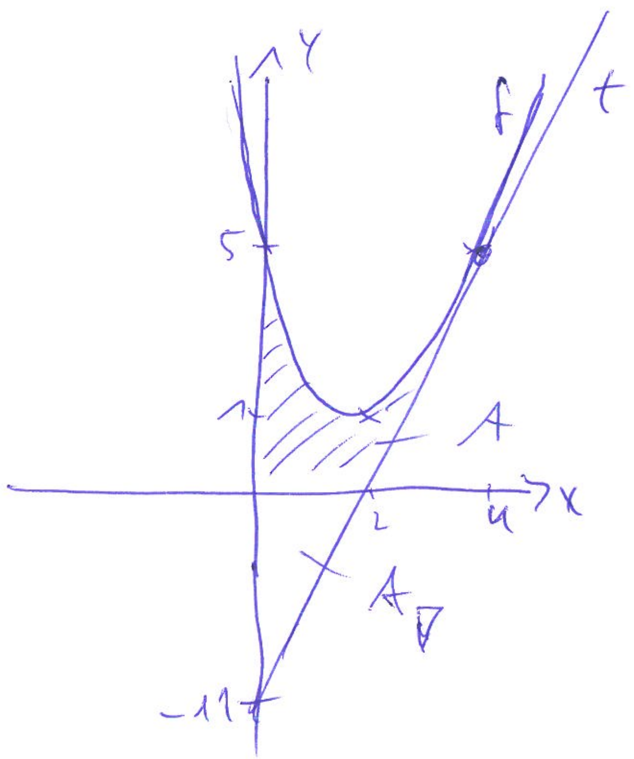
$f'(x) = 2x - 4$

$m = f'(4) = 4$

$y_P = f(4) = 5$

$t: \quad y = 4(x-4) + 5$

$\underline{y = 4x - 11}$



NST t: $\quad x = \frac{11}{4}$

$A_\triangledown = \frac{1}{2} \cdot \frac{11}{4} \cdot 11$

$= \frac{121}{8}$

$\underline{A} = \int_0^4 (f - g)\,dx - A_\triangledown$

$= \int_0^4 (x^2 - 8x + 16)\,dx - \frac{121}{8}$

$= \left[\frac{1}{3}x^3 - 4x^2 + 16x\right]_0^4 - \frac{121}{8}$

$= \frac{64}{3} - \frac{121}{8}$

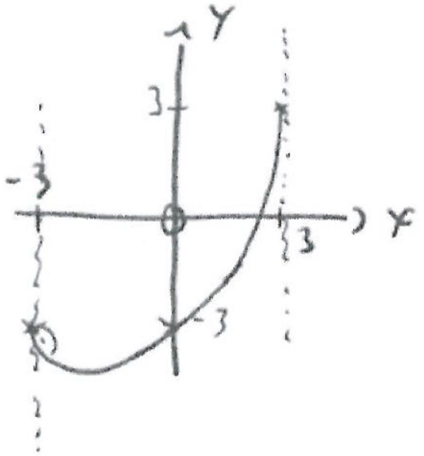
$= \underline{\underline{\frac{149}{24}}}$

2. $9 - x^2 \geq 0$

$|x| \leq 3 \qquad \mathbb{D} = [-3; 3]$

Pass H 12

3h



$x - \sqrt{9-x^2} = 0$

$x^2 = 9 - x^2$

$x = \pm \frac{3}{2}\sqrt{2} \qquad$ Probe : $\underline{x = \frac{3}{2}\sqrt{2}}$ NST

$f'(x) = 1 + \frac{x}{\sqrt{9-x^2}} \quad ; \quad \mathbb{D}' =]-3; 3[$

$f'(x) = 0$

$x = \pm \frac{3}{2}\sqrt{2} \qquad$ Probe $\underline{x = -\frac{3}{2}\sqrt{2}}$

$\underline{y = -3\sqrt{2}}$

nicht verlangt in 3h

VZT

x	$-2{,}5$	$-\frac{3}{2}\sqrt{2}$	-2
$f'(x)$	$-$	0	$+$
	↘	Min →	↗

$\underline{Min\left(-\frac{3}{2}\sqrt{2} \,\middle|\, -3\sqrt{2}\right)}$

waag. Tangente

senkrechte Tangente: $x = \pm 3$, da dort f definiert, f' aber nicht, daher senkrechte Tangente

$\boxed{\underline{\mathbb{W} = [-3\sqrt{2}; 3]}}$

nicht verlangt in 3h

Kass H 12

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3. a)

M liegt auf Senkrechten zu DA, durch Mitte DA

n

$M_{DA} = \begin{pmatrix} 1,5 \\ 4,5 \end{pmatrix}$

$\vec{DA} = \begin{pmatrix} 1 \\ -3 \end{pmatrix} \longrightarrow \vec{n}_{DA} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$

$n: \vec{x} = \begin{pmatrix} 1,5 \\ 2,5 \end{pmatrix} + t \begin{pmatrix} 3 \\ 1 \end{pmatrix}$

$1,5 + 3t = 6$

$t = 1,5$

$\underline{M(6|4)}$

$y = 2,5 + 1,5 = 4$

$\vec{MC} = \vec{AM} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$ $\quad \vec{r}_C = \vec{r}_A + 2\vec{AM} = \begin{pmatrix} 10 \\ 7 \end{pmatrix}$ $\quad \underline{\underline{C(10|7)}}$

$AM = 5$ $\quad \vec{r}_B = \vec{r}_C + \vec{DA} = \begin{pmatrix} 11 \\ 4 \end{pmatrix}$ $\quad \underline{\underline{B(11|4)}}$

AB=(9 3)

AB $=\sqrt{90}$

AD $=\sqrt{10}$

A(ABCD)$=\sqrt{90}\sqrt{10}$ $= \underline{\underline{30}}$

Passt 12
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$$f'(x) = \frac{(2x+a)(x-3) - (x^2+ax+b)}{(x-3)^2}$$

$$f'(x) = \frac{x^2-6x-3a-b}{(x-3)^2}$$

I. $f(5) = 9$

II. $f'(5) = 0$

I. $5a+b+25 = 18$

II. $-3a+b+5 = 0$

$a = -1$

$b = -2$

$$f(x) = \frac{x^2-x-2}{x-3}$$

$D = \mathbb{R} \setminus \{3\}$ senk. Asympt. $x = 3$ VZW

$$f'(x) = \frac{x^2-6x+5}{(x-3)^2}$$

NST. $f(x) = 0$

$x^2-x-2 = 0$

$(x-2)(x+1) = 0$

$\underline{x_1 = 2}$

$\underline{x_2 = -1}$

Ext. $f'(x) = 0$

$x^2-6x+5 = 0$

$(x-5)(x-1) = 0$

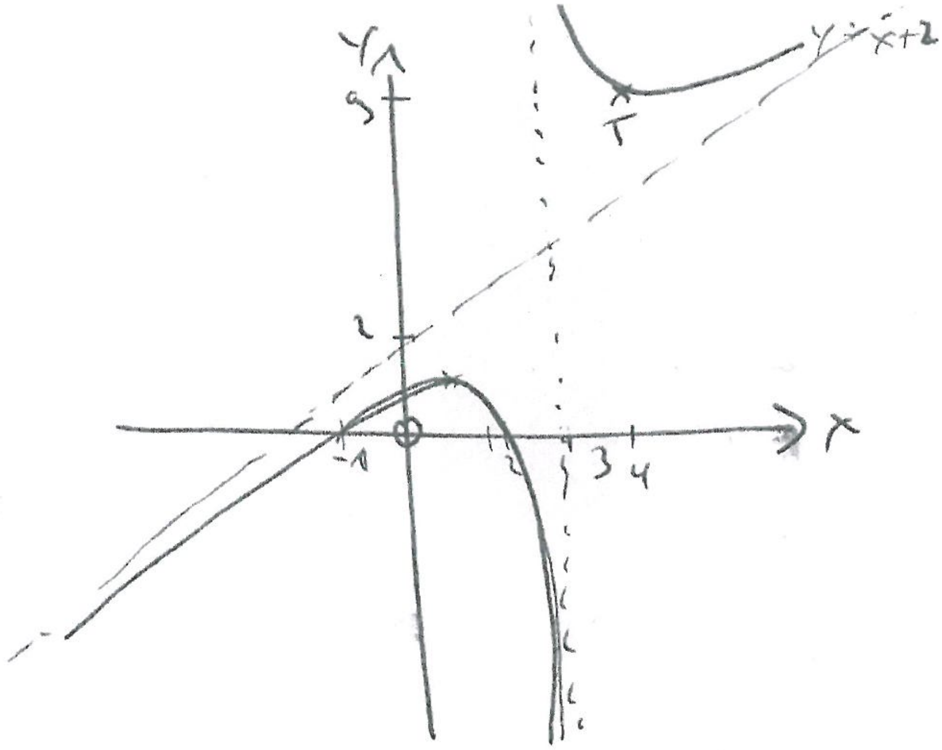
$\underline{x_1 = 1 \quad y_1 = 1}$

$\underline{x_2 = 5 \quad y_2 = 9}$

$$\frac{x^2-x-2}{x-3} = \underbrace{x+2}_{} + \frac{4}{x-3}$$

<u>schräge A. $y = x+2$</u>

4.



$\mathbb{W} =]-\infty; 1] \cup [9; \infty[$

Pasi Lf 12
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Pass H12

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5 a)

1) $P(2b; 1g; \text{z.m.Z.}) = 3 \cdot \left(\frac{13}{20}\right)^2 \cdot \frac{7}{20} = \underline{44{,}4\%}$

b) $15 = 1+2+3+9 = 1+3+4+7 = \cancel{1+1+4+8+3} = \cancel{3+4+6+2}$

$= 1+2+4+8 = 1+3+5+6 = 2+3+4+6$

$= \cancel{2+3}$

$= 1+2+5+7$

6 mit je $4 \cdot 3 \cdot 2 \cdot 1$ Ziehungsmöglichkeiten

WS je $= \frac{1}{10 \cdot 9 \cdot 8 \cdot 7}$

$P(\text{Summe der } 4 = 15 \text{ z.o.Z.}) = 6 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot \frac{1}{10 \cdot 9 \cdot 8 \cdot 7} = \underline{\underline{\frac{1}{35} = 2{,}86\%}}$

c) $x : b$

$20 - x : g$

$P(\text{gleiche Farbe}: bb, gg) = \frac{x(x-1) + (20-x)(19-x)}{20 \cdot 19}$
z.o.Z.

$= \underline{\frac{x^2 - 20x + 190}{190}}$

$P(x) = \frac{9}{10}$

$x^2 - 20x + 19 = 0$

$(x-19)(x-1) = 0$

Ja, für: $\underline{x_1 = 19}$
$\underline{x_2 = 1}$