Test in Analysis ◇ Examen en analyse ◇ Type I1 ◇ I / 1

Probl. 1 Diagramme? • *Diagrammes?*

(a) $f_1(x) = \dfrac{x^2}{x^2 + \sin(x)^2}$, $D_{f_1} = [-6, 6]$

(b) $f_1(x) = 1 \Rightarrow x = ?$ Ohne Rechner! • *Sans calculatrice!*

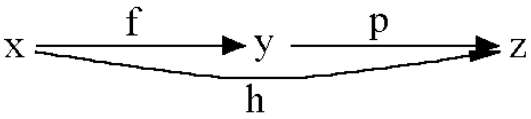
(c) $f_2(x) = -1 + \sin([x])$, $D_{f_2} = [-6, 6]$

(d) $f_3(x) = \cos(e^{|x|})$, $D_{f_3} = [-2.5, 2.5]$

Probl. 2 $x = 4 + \dfrac{5}{5 + \dfrac{5}{5 + \dfrac{5}{\ddots}}} = ?$ $\rightsquigarrow$ $x \in \mathbb{Q}$?

Ohne Rechner! • *Sans calculatrice!*

Probl. 3



$f(x) = e^x$

$p(x) = \dfrac{1}{2}\, ln(x^2)$

(a) $h(x) = (p \circ f)(x)) = ?$
$\rightsquigarrow$ Diagramm? • *Diagramme?*

(b) $h(x) = (f \circ p)(x)) = ?$
$\rightsquigarrow$ Diagramm? • *Diagramme?*

(c) $h(x) = (f(p(x)^2) = ?$
$\rightsquigarrow$ Diagramm? • *Diagramme?*

Probl. 4 $f(x) = (-1 + x) \cdot \left(-1 + x^2\right)$, $p(x) = -8 + 12\,x - 6\,x^2 + x^3$

(a) $h(x) = f(x) \cdot p(x)$

i. Nullstellen? • *Zéros?* Ohne Rechner! • *Sans calculatrice!*

ii. Diagramm? • *Diagramme?*

(b) $u(x) = \dfrac{f(x)}{p(x)}$

i. Pole? • *Pôles?* Ohne Rechner! • *Sans calculatrice!*

ii. Diagramm? • *Diagramme?*

Probl. 5 $f(x) = e^{-\sin(x)^2}$, $g(x) = -0.5\,x$

(a) Diagramm? • *Diagramme?*

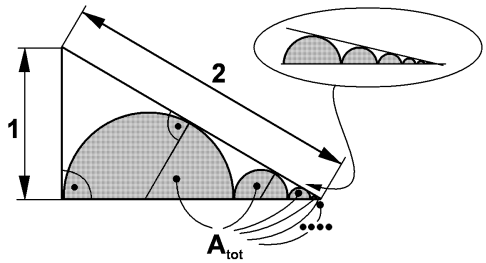
(b) Verhalten für grosse $|x|$?
• *Comportement pour des $|x|$ qui sont grands?*

(c) $m \leq f(x) \leq M \rightsquigarrow m, M = ?$ Ohne Rechner! • *Sans calculatrice!*

(d) $f(x) = g(x) \rightsquigarrow x \approx ?$

Probl. 6 $4^{2\,x} = 3^x \cdot \pi^5 \cdot 4^{-3\,x} \rightsquigarrow x = ?$ Ohne Rechner! • *Sans calculatrice!* $\rightsquigarrow$

Probl. 7 $A_{tot} = ?$



Probl. 8 $\lim\limits_{n\to\infty} \dfrac{n\,\left(-e^{-n} - 3\,n^2 + 4\,n^3 + n^2\,\cos(n)\right)}{4\,n^2 + 3\,n^4 - \sin(n^2)} = ?$ Ohne Rechner! • *Sans calculatrice!*

Probl. 9 $(\sum\limits_{k=0}^{\infty} \dfrac{1}{2\cdot 3^k} + \dfrac{1}{3\cdot 4^k}) - \dfrac{7}{6} = ?$ Ohne Rechner! • *Sans calculatrice!*

Probl. 10 $\lim\limits_{n\to\infty} \dfrac{n + 2\,ln(n)}{3\,n - 4\,ln(n) + 5\,\tan(\frac{1}{n})} = ?$ Ohne Rechner! • *Sans calculatrice!*

Viel Glück! • *Bonne chance!*

WIR