Übungen in Analysis ◇ Exercices en Analyse ◇ T. B2 ◇ II / 3

Probl. 1 **Studiere: • Etudier:** $f(x) = ln(x) \;\Rightarrow\; f'(x) = \dfrac{1}{x}$

$$x = f(z) = ln(z) \overset{f^{-1}}{\longmapsto} z = f^{-1}(x) = e^x \qquad \Rightarrow\; (f^{-1}(x))' = ?$$

$$(f^{-1}(x))' = \frac{1}{f'_z(z)}_{|_{z=f^{-1}(x)=e^x}} = \frac{1}{ln(z)'_z}_{|_{z=e^x}} = \frac{1}{(\frac{1}{z})}_{|_{z=e^x}} = z_{|_{z=e^x}} = e^x$$

$$\boxed{(e^x)' = e^x}$$

Probl. 2 $f(x) = e^{2\,x} \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 3 $f(x) = e^{(x^2)} \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 4 $f(x) = e^{\sin(x)} \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 5 $f(x) = e^{a\,x+b} \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 6 $f(x) = ln(x^7) \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 7 $f(x) = x \cdot e^x + ln(\cos(x)) \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 8 $f(x) = x^x \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 9 $f(x) = \sin(x) \cdot \cos(2\,x + 3) \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 10 $f(x) = \sin^3(x) - 2\,\sin^2(x) + 4\,\sin(x) - 5 \qquad \rightsquigarrow\; f'(x) = ?$

Probl. 11 $f(x) = 2\,(x-4)\,(x-2)\,(x+1), \;\; f'(x_1) = f'(x_2) = 0$
$\rightsquigarrow\; x_1 = ?, \;\; x_2 = ?$