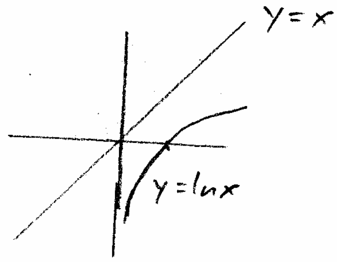
158/16 $\quad f(x) = x - \ln x \quad ; \mathbb{D} = \mathbb{R}^+$

a) $f(x) = 0$ nie!

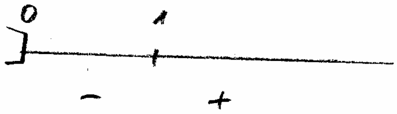
$x = \ln x$



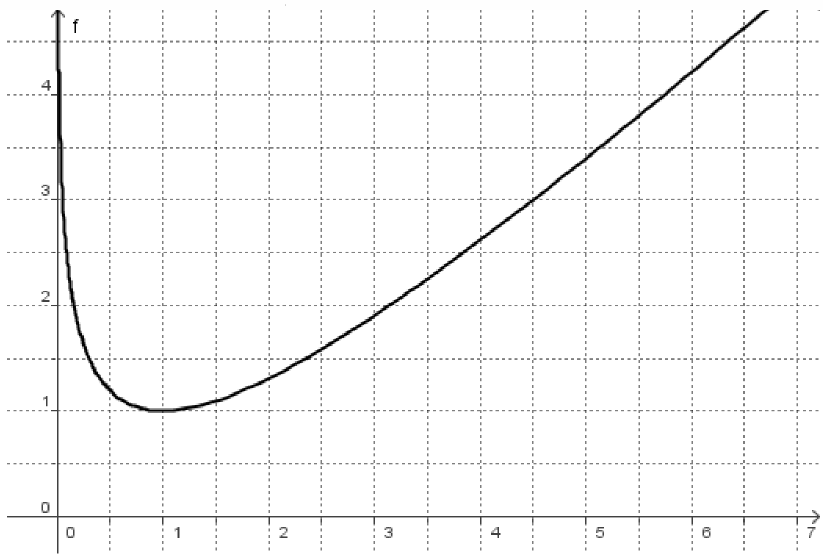
$f'(x) = 1 - \frac{1}{x} \stackrel{!}{=} 0$

$1 = \frac{1}{x}$

$x = 1$ $\quad f'$



TP(1|1)



b) $f'(x) = -e$

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

$\frac{1}{x} = 1 + e$

$x = \frac{1}{1+e}$

$f\left(\frac{1}{1+e}\right) = \frac{1}{1+e} - \ln\left(\frac{1}{1+e}\right)$

$= \frac{1}{1+e} - (\ln 1 - \ln(1+e))$

$= \frac{1}{1+e} + \ln(1+e)$

$f'(x) = e$

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

$x = \frac{1}{1-e}$ ↯ $\quad \frac{1}{1-e} < 0$!

c) Sei $(x_0 / y_0) = (x_0 \mid x_0 - \ln x_0)$ ein beliebiger Punkt auf G_f

$$\Rightarrow f'(x_0) = 1 - \frac{1}{x_0} = m_{Tangente}$$

da die gesuchte Tangente Ursprungsgerade ist, gilt $t = 0$:

$$y = mx + t$$

$$y = \left(1 - \frac{1}{x_0}\right) \cdot x + 0$$

$$y_0 = \left(1 - \frac{1}{x_0}\right) \cdot x_0$$

$$x_0 - \ln x_0 = x_0 - 1 \quad | -x_0$$

$$\ln x_0 = 1$$

$$\underline{\underline{x_0 = e}} \qquad f(x_0 = e) = e - 1 \quad \Rightarrow P(e / e-1)$$