

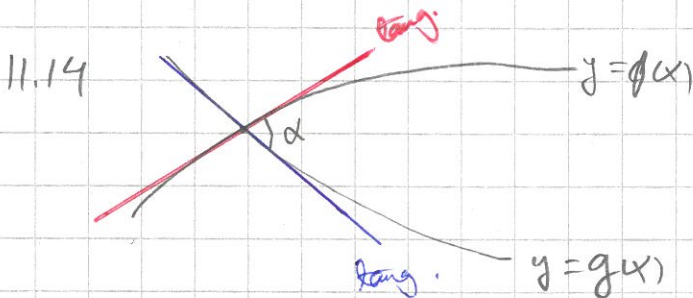
11.9 $h(x) = g(\varphi(x))$, $\varphi(x) = e^x$, $g(x) = 2x^2 + 1$
 $\varphi'(x) = e^x$, $g'(x) = 4x$
 $= g(e^x) = 2(e^x)^2 + 1$

Elmeri: $h'(x) = g'(\varphi(x)) \cdot \varphi'(x) = 4e^x \cdot e^x = 4e^{2x}$

KORJAUS: $h'(x) = g'(\varphi(x)) \cdot \varphi'(x) = 4e^x \cdot e^x = 4e^{x+x} = 4e^{2x}$

Uolmeri: $h(x) = g(\varphi(x)) = 2(e^x)^2 + 1 = 2e^{x^2} + 1$
 $h'(x) = 2e^{x^2} \cdot (2x) = 4xe^{x^2}$

KORJAUS: $h(x) = 2(e^x)^2 + 1 = 2e^{2x} + 1$
 $h'(x) = 2e^{2x} \cdot 2 = 4e^{2x}$



Käyrän leikkauspiste = leikkauspisteeseen piirrettyjen tangenttien välinen kulma

leikkauspiste: $\begin{cases} y = \ln(x-1) \\ y = 2\ln(3x-13) \end{cases}$, $x-1 > 0 \Rightarrow x > 1$, $3x-13 > 0 \Rightarrow x > \frac{13}{3}$

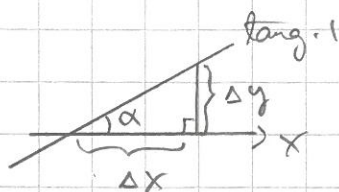
$\Rightarrow \ln(x-1) = 2\ln(3x-13)$
 $\Rightarrow e^{\ln(x-1)} = e^{2\ln(3x-13)}$
 $\Rightarrow x-1 = e^{\ln(3x-13)^2}$
 $\Rightarrow x-1 = (3x-13)^2$
 $\Rightarrow 9x^2 - 79x + 170 = 0$

$\ln(a^b) = b \ln a$
 $\log_a a^b = b$

$\Rightarrow x = \frac{34}{9} < \frac{13}{3}$ (5%)

$\varphi(x) = \ln(x-1)$
 $\varphi'(x) = \frac{1}{x-1} \cdot 1 \Rightarrow k_{t1} = \varphi'(5) = \frac{1}{5-1} = \frac{1}{4}$

$\text{D} \ln x = \frac{1}{x}$



$k_{t1} = \frac{\Delta y}{\Delta x} = \tan \alpha = \frac{1}{4} \Rightarrow \alpha = 14,036^\circ$

$g(x) = 2\ln(3x-13)$
 $g'(x) = 2 \cdot \frac{1}{3x-13} \cdot 3 = \frac{6}{3x-13}$
 $\Rightarrow k_{t2} = g'(5) = \frac{6}{3 \cdot 5 - 13} = \frac{6}{2} = 3$
 $\Rightarrow \beta = 71,565^\circ$