$\log_b a = x \Leftrightarrow b^x = a$, $a > 0$, $b > 0$, $b \neq 1$

Esim. a) $5^x = 3 \Leftrightarrow x = \log_5 3 \approx 0{,}683$

b) $\log_2 8 = 3 \quad (2^3 = 8)$

c) $\log_2 \frac{1}{16} = -4 \quad (2^{-4} = \frac{1}{2^4} = \frac{1}{16})$

$$\boxed{\begin{aligned} \log_a a^x &= x \\ a^{\log_a x} &= x \end{aligned}}$$

$$\boxed{D(f \cdot g) = f' g + f g'}$$

Esim. a) $D(x^2 \cdot e^x) = 2x \cdot e^x + x^2 \cdot e^x$

b) $D\, e^{5x} = e^{5x} \cdot 5$ ← $D(5x)$ (sisäfunktion derivaatta)

c) $D\, 5^x = D\, e^{\ln 5^x} = D\, e^{x \ln 5} = e^{x \ln 5} \cdot \ln 5 = e^{\ln 5^x} \cdot \ln 5 = 5^x \ln 5$

Yleisesti.

$$\boxed{\begin{aligned} D\, e^x &= e^x \\ D\, e^{f(x)} &= e^{f(x)} \cdot f'(x) \\ D\, a^x &= a^x \ln a \end{aligned}}$$

21.5 a) $D\, e^{\frac{x}{2}} = e^{\frac{x}{2}} \cdot \frac{1}{2}$ $\left(\frac{x}{2} = \frac{1}{2}x\right)$

b) $D\, e^{\frac{1}{2}x^2} = e^{\frac{1}{2}x^2} \cdot x$

c) $D(\frac{1}{2} \cdot e^{x^2}) = \frac{1}{2} D\, e^{x^2} = \frac{1}{2} e^{x^2} \cdot 2x = x e^{x^2}$

d) $D(e^{-x^2+x}) = e^{-x^2+x} \cdot (-2x+1)$

21.6 a) $D(x \cdot e^x - 6) = 1 \cdot e^x + x \cdot e^x = e^x + x e^x$

b) $D \frac{e^x}{5x} = \frac{e^x \cdot 5x - e^x \cdot 5}{(5x)^2} = \frac{5x e^x - 5 e^x}{25 x^2} = \frac{x e^x - e^x}{5x^2}$

21.10 $f(x) = e^{2x} - x$

$f'(x) = e^{2x} \cdot 2 - 1 = 2 \Leftrightarrow 2e^{2x} = 3 \quad | :2$

$\Leftrightarrow e^{2x} = \frac{3}{2} \quad | \ln$