

Exponential function and logarithm

1. Roughly sketch the following functions for $\alpha_1 = 1$, $\alpha_2 = e$ and $\alpha_3 = 10$.

a) $f(x) = e^{\alpha x}$

b) $f(x) = \alpha e^x$

c) $f(x) = \alpha^x$

d) $f(x) = \ln(\alpha x)$

e) $f(x) = \alpha \ln(x)$

f) $f(x) = \log_{\alpha}(x)$

2. Solve the following equations.

a) $3^x = 1$

b) $10^x = 0,01$

c) $e^{x+2} = 2^{\frac{1}{x}}$

d) $\lg(3x + 1) - 1 = 0$

e) $\lg(x^2) - \lg(x) = 2$

f) $2 \ln(x^3) - \ln(x^2) = 2.4$

g) $\ln\left(\frac{1}{x}\right) = e$

h) $\log_2(x - 1) + \log_2(x) = 1 + \log_2(3x - 5)$