

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