Exercises

Mathematics A1a

Inverse functions

1. Determine, which of these functions are odd, which are even, and which are neither odd, nor even:

$$y = \frac{1}{x^3}, \ y = 4x^2 - \frac{1}{x^4 + 2}, \ y = x - x^2, \ y = \frac{x}{x^2 + 4x^6}, \ y = x^2 \sin x, \ y = \frac{\cos 2x}{x^4}$$

2. Graph these functions:

$$y = 4x^2 - 8x, \ y = \frac{3}{2x - 5}, \ y = \frac{1}{(x+2)^3}, \ y = \sqrt{2x - 3}, \ y = 2(x - 3)^3, \ y = \frac{2x}{3 - x},$$

$$y = \ln|x|, \ y = |\ln x|, \ y = 3\sin(2x + \pi) - 1, \ y = \frac{1}{3}\text{tg}(\frac{x}{2} - \pi).$$

3. Give the domain of these functions:

$$y = \lg \lg x, \ y = \ln \cos x, \ y = \sqrt{\lg \sin x} + \ln(3 - x^2), \ y = \frac{x - 3}{\sqrt{x^2 - x - 2}}.$$

4. Give the inverse of these functions:

$$y = x^3 - 1, \ y = \ln(3x + 2), \ y = \sqrt{e^{2x} - 1}, \ y = \frac{2x}{x - 1}, \ y = 3^{x+2} + 5,$$

$$y = \begin{cases} (x-1)^2, \ \text{ha } x \le 1, \\ -x, \ \text{ha } x > 1 \end{cases}$$

5. Find the inverses of these functions, then give the domains and the ranges of the inverse functions:

$$y = \arccos(2x - 1), \ y = \text{th}2x + 1,$$

6. Find the domain and range and the inverse of these functions, then graph the functions and their inverses:

$$y = \arccos(x + 2), \ y = 3\arcsin\frac{x}{2} + 1, \ y = \frac{1}{3}\text{arctg}\frac{x - 5}{2},$$

$$y = \text{sh}2x, \ y = 2\text{ch}(x - 1), \ y = \text{arth}\frac{x}{3}.$$