

Mathematical Analysis (470-2110/06)

Exercises – Part 2

The problems given below are similar to those, that will appear on your semester tests.

1. Inverse function

For the given function f , verify if there exists the inverse function f^{-1} . If f^{-1} exists find it's equation.

1. $f(x) = x + \frac{1}{x}$

2. $f(x) = \frac{x-1}{2x+3}$

3. $f(x) = \frac{x+2}{x-2}$

4. $f(x) = \ln(x+2)$

5. $f(x) = x^2 - 3$, where $D(f) = (-\infty, 0]$

6. $f(x) = x^2 + x$, where $D(f) = [0, \infty)$

7. $f(x) = e^x + e^{-x}$, where $D(f) = [0, \infty)$

8. $f(x) = \cos(x + \pi) - 2$, where $D(f) = [\pi, 2\pi]$

2. Trigonometric and Cyclometric Functions

1. Find all x , so that:

(a) $\cos 2x + \cos x = 0$,

(b) $\sin 2x - \cos x \leq 0$,

(c) $2 \sin 2 = \tan x$,

(d) $1 - \sin^2 x + \cos 2x = \frac{3}{4}$,

(e) $\sin x > \frac{1}{2}$,

(f) $\cos x = \frac{2}{3}$,

(g) $\tan x < 1$,

2. Evaluate the following expressions:

(a) $\arcsin\left(\frac{1}{2}\right)$,

(b) $\arccos(1)$,

(c) $\arctan\left(\frac{1}{\sqrt{3}}\right)$,

(d) $\operatorname{arccot}\left(\frac{-\sqrt{3}}{3}\right)$,

(e) $\operatorname{arccot}(\sqrt{3})$,

(f) $\arcsin\left(\sin\left(\frac{\pi}{4}\right)\right)$,

(g) $\arctan\left(\tan\left(-\frac{3\pi}{4}\right)\right)$,

(h) $\operatorname{arccot}\left(\cot\left(-\frac{3\pi}{4}\right)\right)$.